

4.3 Stakeholder, HOA and Resident Meetings List

Reata Wash Meetings with Notes

Stakeholder Meetings

	Meeting Date	Meeting Name	Location	Attendees	Notes
1	February 9, 2015	FEMA	JE Fuller Office		
2	August 5, 2015	FCDMC	FCDMC		
3	September 9, 2015	FEMA	FPMA Conference, California		
4	January 21, 2016	Grayhawk Development	Grayhawk Corporate Office		
5	January 22, 2016	FCDMC	FCDMC		
6	January 28, 2016	DMB	DMB		
7	February 3, 2016	Catholic Diocese & Notre Dame	Notre Dame Prep		
8	February 10, 2016	Toll Brothers	8767 E. Via De Ventura, Suite 390		
9	February 11, 2016	USACE	USACE	Sallie Diebolt, USACE; Scott Mars, City of Scottsdale; Jeremy Casteel, Logan Simpson	Meeting summary attached
10	February 23, 2016	USBR	USBR	Scott Mars, City of Scottsdale; Jeremy Casteel, Logan Simpson; Sean Heath, Bureau of Reclamation	
11	February 23, 2016	CAP/CAWCD	CAP	Scott Mars, City of Scottsdale; Greg Toth, City of Scottsdale; Tom Fitzgerald, CAP; Don Crandell, CAP; Darrel Wood, Wood-Patel	Meeting summary attached
12	February 29, 2016	ASLD	ASLD Phoenix Office	Section Manager, Max Masel, ASLD Director, Dan Worth, City of Scottsdale, Executive Director Public Works, Kroy Ekblaw, City of Scottsdale, Preserve Director/Strategic Projects, Darrel Wood, Wood/Patel, Project Manager	Meeting summary attached
13	April 4, 2016	CAP/CAWCD	CAP		
14	April 4, 2016	USBR/West World	USBR		
15	April 20, 2016	FCDMC	FCDMC		
16	May 5, 2016	DMB	DMB Office	Scott Mars; Susan Bitter Smith; Darrel Wood; Melinda Gulick; DMB; Chris Rivero, DMB	A review of the study proposed options was presented. DMB is supportive of the City moving forward with their goal of reducing the FEMA flood plain. Someone from DMB will be at the May 18 public meeting.
17	May 12, 2016	Grayhawk Development	Grayhawk Corporate Office	Scott Mars, Darrel Wood; Susan Bitter Smith; Greg and Taylor Tryhus; Brian and Ryley Baehr; Patricia Perna	Grayhawk strongly supports moving forward with study presentation to Council and to a project - had great interest in impacts on Dobson Wash
18	June 15, 2016	USACE	USACE		

Resident/HOA Meetings and Phone Calls

	Meeting Date	Meeting Name	Location	Attendees	Notes
1	December 8, 2014	Massoud Rezakhani	City of Scottsdale	Ahern, Randy Grant, Michael Clack, Massoud Rezakhani	Meeting summary attached
2	February 12, 2015	Church Road LLC	Scottsdale Civic Center Library, Silver Conference Room	Patel, Jon Ahern, Susan Bitter Smith, Ed Marklow; Marilyn and Don Andrews; JD Helms; Massoud Rezakhani	Meeting summary attached
3	May 8, 2015	Church Road LLC	City Hall Kiva Conference Room		
5	October 29, 2015	Church Road LLC	City Hall	Randy Grant; Michael Clack; Greg Toth; Massoud Rezakhani; Marilyn Andrews; Donald Andrews	
6	February 10, 2016	DC Ranch Community Council	20555 N Pima Rd, Suite 140	Greg Toth, Susan Bitter Smith, Managers of all of the DC Ranch HOA's and Melinda Gulick	Susan and Greg provided an overview of the proposed study and information about the upcoming public meeting. The Managers were very happy to promote the public meeting to their residents and agreed to do so through their community newsletters and emails. Greg walked through the scope of the study. All of the attendees were very supportive of the City moving forward to look at the study options. Contact information for the study team was distributed in case there were follow up questions from residents.
7	February 18, 2016	Troon North Association	Troon North Golf Club	Darrel Wood; Susan Bitter Smith; Manny Siprut	Troon North Association Board Meeting - February 18 - 3 PM at Troon North Golf Club. Troon North HOA Board led by Acting President Manny Siprut. Questions focused on what the difference was between the Reata Wash study and the Flood Control District's Rawhide Wash Study. Board was supportive of the City's focus, particularly with emphasis on the need for public safety services to be accessible to citizens in the case of flooding. No follow up needed. The Association will promote the two public meetings.
8	February 29, 2016	Coalition of Greater Scottsdale M	City Hall	Scott Mars; Susan Bitter Smith; Sonnie Kirley, Linda Whitehead; Copper Phillips	Questions asked: Who are we meeting with in outreach? How many structures in the study area have flood insurance? How is this related to the old Desert Greenbelt study? COGS is very pleased to promote our public meetings and will continue to do so.
9	February 29, 2016	Church Road LLC	City Manager's Office		
10	April 17, 2016	Ladera Vista HOA			HOA canceled the meeting
11	April 19, 2016	Pinnacle Peak Vistas III HOA	9000 East Pima Center Parkway	Darrel Wood	Darrel Wood spoke and answered questions for approximately 1/2 hour. He communicated that the purpose of the city sponsored study was flood hazard reduction within a FEMA designated floodplain. A byproduct of eliminating flood hazards would be a reduced floodplain. This caused questions and comments on flood insurance, many complained about the flood insurance cost mortgage requirement. He mentioned approximately 80% of the drainage corridor improvements to support a potential FEMA compliant solution was built. He mentioned the Flood Control District of Maricopa County as a potential partner should the study become a project. He mentioned no funding has been allocated by Council for a project and council has not approved a project. He mentioned the city website (please sign up for news updates) and the next public meeting May 18, 2016.

	Meeting Date	Meeting Name	Location	Attendees	Notes
12	May 1, 2016	Craig and Ginger Schmersal	Schmersal Residence	Massoud Rezakhani, Craig Schmersal, Ginger Schmersal, Greg Toth	Mr. Toth verbally described the open and covered channel options. Ms. Schmersal asked where the covered, or culvert option, if selected, would start. I indicated that it would start downstream of the Pinnacle Peak Road crossing. Ms. Schmersal stressed that she uses the wash to ride her horses and was concerned about both options. Ms. Schmersal expressed her concern with the disruption of her quality of life during the correction phase. Mr. Toth indicated that we are just in the study phase and seeking input from various neighborhoods. Mr. Toth told her he would make a note of her concern. After some discussion about storm events and how we develop them, we had a little more discussion about her feelings. She stated that the first public meeting seemed to be nothing more than a scare tactic and that she was offended by this City's presentation. Massoud Rezakhani asked a few questions and then stated that he did not agree with the City plan and restated his opposition to the study.
13	May 2, 2016	Attorney Paul Gilbert	Paul Gilbert's Office	Scott Mars, Darrel Wood, Susan Bitter Smith, Paul Gilbert, Dennis Newcombe	Mr. Gilbert who represents a group of Calle de Las Brisas neighbors. Study overview was presented. Paul Gilbert asked for details of upcoming May 18 meeting. Those details have been sent. He would also like to see a map indicating city ownership and ROW in the potential channel area in the northern part of Reach 2.
14	Week of May 9	JD Helms (Church Road LLC)	Phone Call		Phone call and provided proposed map prior to public meeting
15	Week of May 9	Paul Gilbert	Phone Call		Phone call and provided proposed map prior to public meeting
16		Greater Pinnacle Peak HOA	Phone Call		Called to schedule, HOA declined, agreed to share public meeting information with residents
17		Tierra Bella HOA	Phone Call		Called to schedule, HOA declined, agreed to share public meeting information with residents
18		La Vista HOA	Phone Call		Called to schedule, HOA declined, agreed to share public meeting information with residents
19		Ironwood Village HOA	Phone Call		Called to schedule, HOA declined, agreed to share public meeting information with residents
20		Estancia HOA	Phone Call		Called to schedule, HOA declined, agreed to share public meeting information with residents
21		Pinnacle Peak Reserve HOA	Phone Call		Called to schedule, HOA declined, agreed to share public meeting information with residents
22		Pinnacle Paradise HOA	Phone Call		Called to schedule, HOA declined, agreed to share public meeting information with residents
23		Pinnacle Peak HOA	Phone Call		Called to schedule, HOA declined, agreed to share public meeting information with residents
24		Windgate HOA	Phone Call		Called to schedule, HOA declined, agreed to share public meeting information with residents

Public Meetings

	Meeting Date	Meeting Name	Location	Attendees	Notes
1	March 2, 2016	Reata Wash Public Meeting	Copper Ridge School	To be provided as part of PI report	To be provided as part of PI report
2	May 18, 2016	Reata Wash Public Meeting	Copper Ridge School	To be provided as part of PI report	To be provided as part of PI report

* **Stakeholders:** Includes government agencies (regional, state, federal) and large property owner

4.4 Study Fact Sheet and Newsletter



Reata Wash Flood Control Study

January 2016

The Reata Wash floodplain encompasses a large area in north Scottsdale between approximately Pinnacle Peak Road and the Central Arizona Project Canal (see study area map). Approximately 30 years ago, the Federal Emergency Management Agency (FEMA) defined the 100 year Reata Wash floodplain.

There are more than 4,600 residential, public facilities and commercial structures located within the floodplain at potential risk of flooding in accordance with FEMA guidelines. Property owners within the floodplain with a federally-backed mortgage are required to carry flood insurance through the National Flood Insurance Program (NFIP).

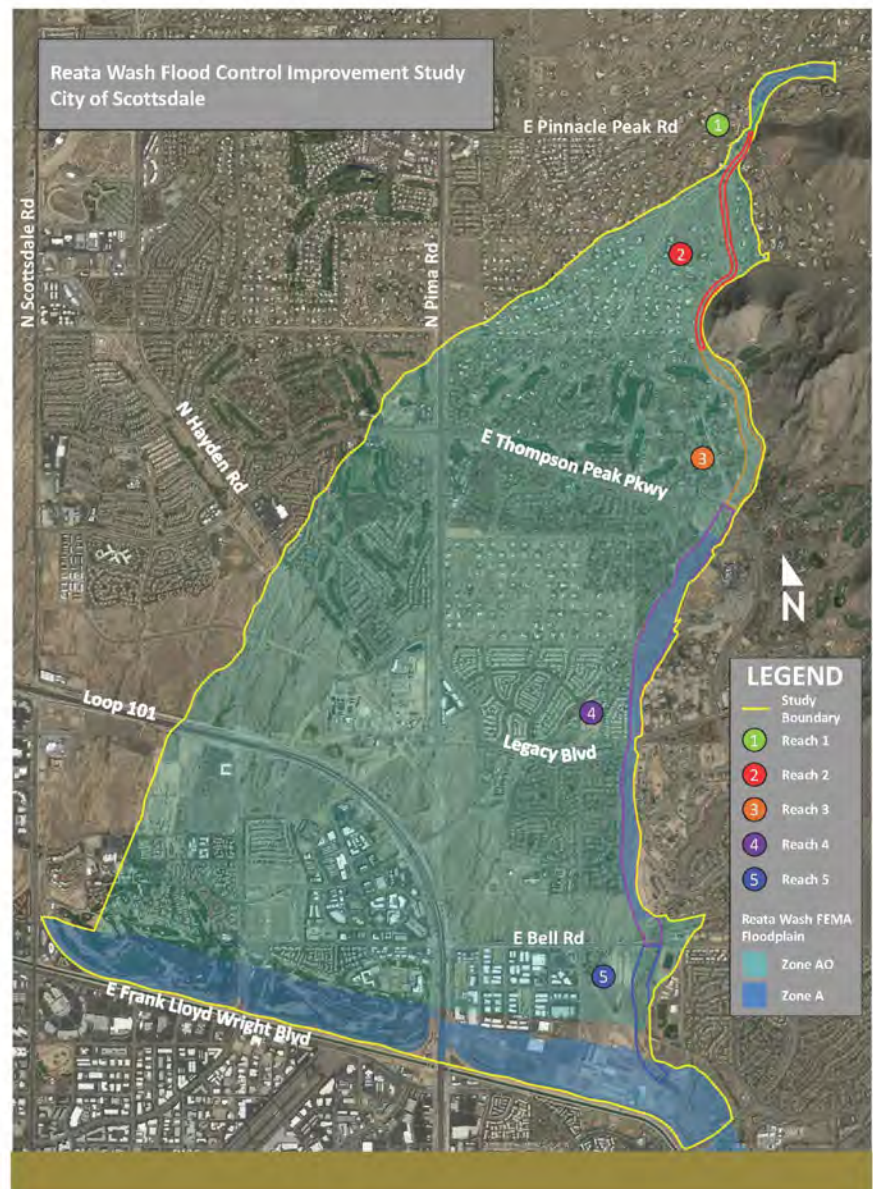
STUDY PURPOSE

The purpose of the study is to identify and recommend flood control measures that will reduce flood risks to residents, property and public infrastructure. We will work with the community to develop a solution that is cost effective, sensitive to the environment and compliant with federal regulations and guidelines. A secondary goal is to remove or reduce the size of the current floodplain designation established by FEMA. This would eliminate or reduce the requirement for many property owners to purchase flood insurance through the NFIP.

FLOODING RISKS IDENTIFIED

The Reata Wash floodplain poses significant flood risks to people, properties and infrastructure in north Scottsdale. The Reata Wash floodplain is a geological alluvial feature where stormwater and sediment travel down irregular terrain and spread out unpredictably in a fan shape.

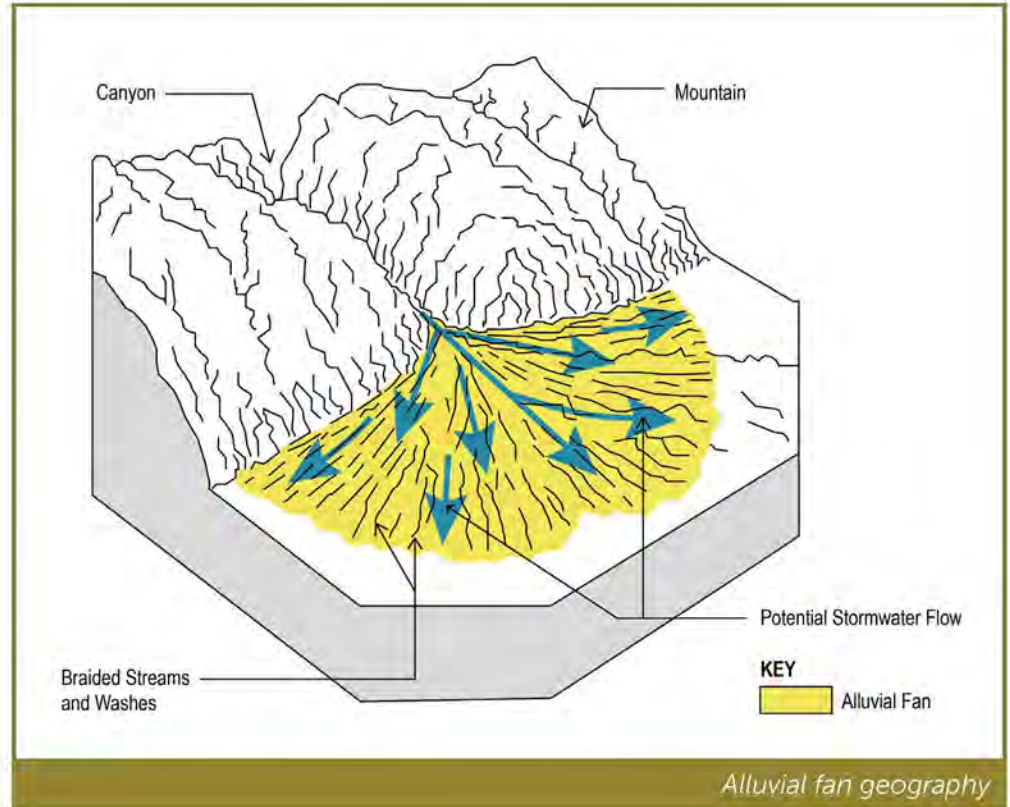
Properties and structures within the floodplain are at some risk of flooding from a major storm event. Flooding will vary depending on where the water spreads across the fan floodplain. In addition, several major transportation arterials – including Pima Road, Thompson Peak Parkway and Pinnacle Peak Road – are likely to be impassible and potentially damaged as the result of a major storm.



FLOOD CONTROL GAPS IN EXISTING INFRASTRUCTURE

Since the FEMA floodplain was designated, bridges, drainage and flood control structures have been built to reduce the risk of flooding. Despite these measures, "gaps" remain in the existing flood control infrastructure – in particular within the upper and lower portions of Reata Wash. Due to these gaps, additional FEMA-compliant solutions for reducing or eliminating the FEMA floodplain are needed.

Reata Wash has been divided into five segments – or reaches – for the study. Flood mitigation measures will be evaluated and recommended in each segment based on existing drainage infrastructure and severity of the flooding predicted.



COMMUNITY INVOLVEMENT AND OPPORTUNITIES FOR INPUT

Public involvement will be a key element of this study. Affected residents will be invited to participate in the study and help evaluate potential alternatives. Community and stakeholder input will be used to help decide which flood control mitigation measures are best suited for each portion of Reata Wash. The city recognizes the unique desert environment in this area, and any options that would be considered would be context-sensitive to be compatible with the surrounding environment as much as feasible. The city is not considering recreational or multi-use opportunities as part of any flood mitigation solution.

Several community and stakeholder meetings will be held throughout the course of the study. The study team will also meet with individual stakeholders, including homeowners' associations, to review the options being considered.

GET INVOLVED

For more information or to sign up for the study email list to receive updates and community meeting notices:

www.scottsdaleaz.gov, Search (Reata)

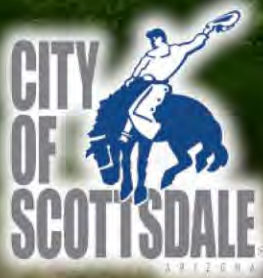
For questions or comments:

GREG TOTH, CFM

City of Scottsdale

Senior Stormwater Hydrologist

gtoth@scottsdaleaz.gov • 480.312.7328



Reata Wash Flood Control Study

Newsletter May 2016

STUDY PURPOSE

The purpose of the study is to identify and recommend flood control measures that will reduce flood risks to residents, property and public infrastructure in the Reata Wash floodplain. There are more than 4,600 residential, commercial and public buildings located within the floodplain that are at potential risk of flooding in accordance with the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP).

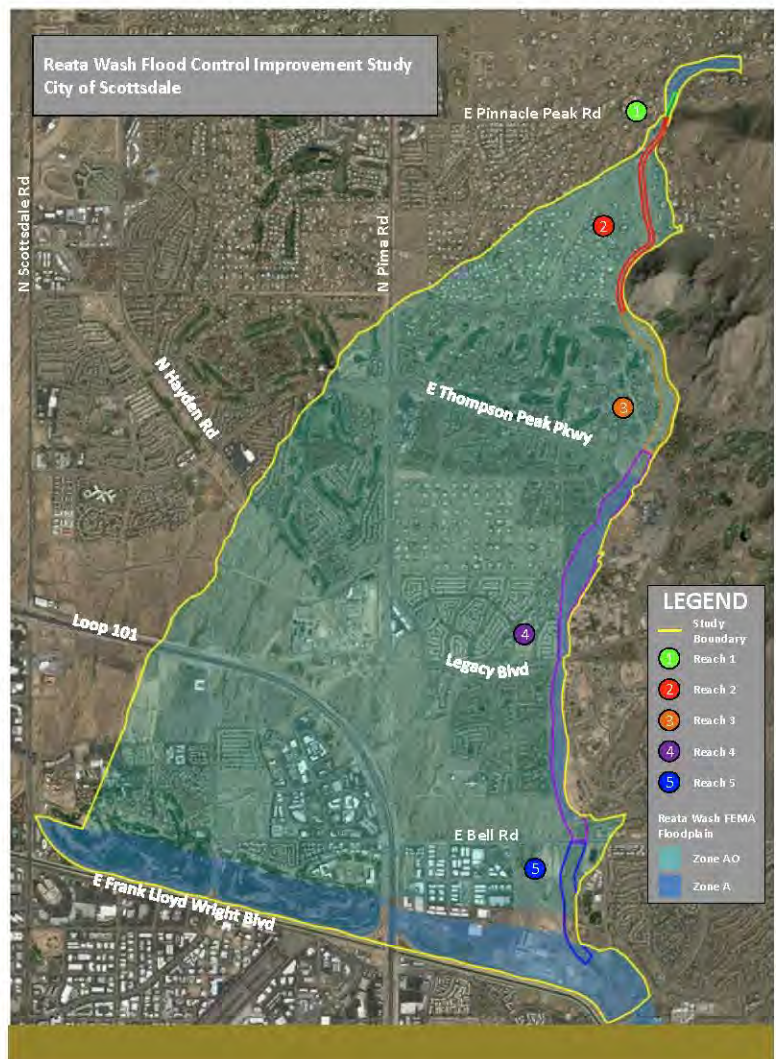
A secondary goal is to remove or reduce the size of the existing FEMA-designated floodplain. This would proportionately reduce the requirement for many property owners to purchase flood insurance. Within the Reata Wash designated floodplain, existing property owners are currently paying more than \$1.8 million annually in flood insurance premiums.

WHY A COMPREHENSIVE SOLUTION IS NEEDED

Reata Wash is an active alluvial fan. Within an alluvial fan, stormwater runoff during a large storm event spreads out and flows down unpredictably along an interconnected series of smaller washes. These washes do not have the capacity to convey stormwater flows from a large, 100-year storm event. This level of storm represents a 1 percent chance of occurring in any given year. In Reata Wash, the 100-year flood is predicted to result in approximately 13,000 cubic feet per second (cfs) of stormwater runoff at the Pinnacle Peak Road crossing at the apex (or starting point) of the alluvial fan. This is the equivalent to 100,000 gallons of stormwater passing through every second. As a result, the stormwater can spread out unpredictably – putting people and properties at risk.

In response to this level of risk, flood control improvements were constructed along some portions of the Reata Wash corridor in conjunction with master-planned developments. However, some gaps remain in areas that were developed prior to any overall flood control improvement plan being considered. These gaps are located primarily within the upper and lower portions of Reata Wash.

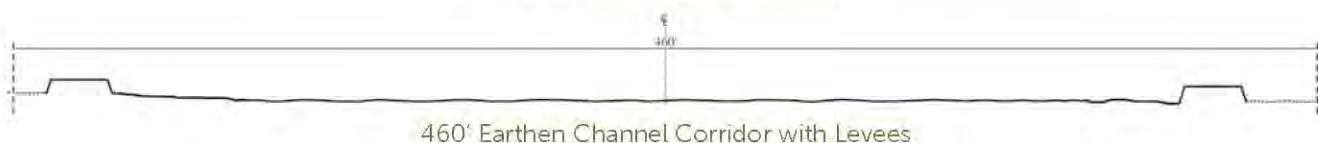
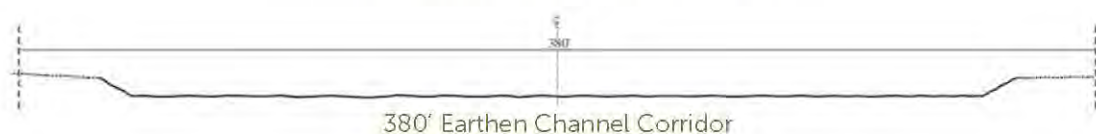
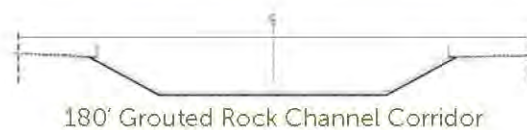
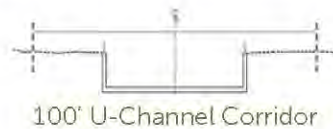
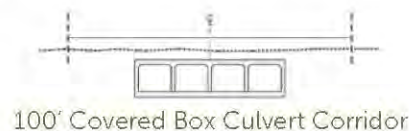
A comprehensive flood control solution is needed to close these gaps and properly convey stormwater within the entire wash corridor. A comprehensive solution will protect the thousands of properties currently at risk. It will also allow for the re-delineation of the FEMA regulatory floodplain by demonstrating that the flood risk has been mitigated.



FLOOD CONTROL CONVEYANCE OPTIONS EVALUATED

The study team evaluated several different types of flood control improvements to convey stormwater along the wash. These options vary in width and the type of material lining the drainage channel. The options evaluated include:

- A covered box culvert (100-foot-wide corridor). Stormwater is carried in a box culvert buried below ground. This is the most expensive option to construct.
- A concrete U-channel (100-foot-wide corridor). Stormwater is carried in an open, concrete channel. A handrail or fence would be required along the channel for safety reasons. This is the second most expensive option to construct.
- A grouted rock channel (120 to 180-foot-wide corridor). This is an open channel lined with large rocks that are grouted in place. This option also requires a handrail or fence along the channel, due to the grade of the slope. This option is about two-thirds the cost of the concrete U-channel to construct and less than half the cost of the box culvert.
- An earthen channel (330 to 380-foot-wide corridor). An earthen channel may include buried bank protection. This channel type exists along some portions of the wash today. It is the least expensive option, but requires a larger channel width and additional land rights, which adds to overall costs and potential impacts.
- An earthen channel with levees (460-foot-wide corridor). This is an earthen channel with the addition of low berms on one or both sides to contain stormwater. This is the widest channel option which requires the most land, and adds to potential costs and impacts.



The Reata Wash has been divided into five segments – or reaches. The conveyance options were evaluated for technical feasibility within each reach. A major consideration for each option is the available City land rights along the wash, because this affects both the cost of a project and the impacts to adjacent properties. The current City rights along the wash vary between 100 and 450 feet, with the narrowest segment within Reach 2 in the upper wash. Along some portions of the upper wash, the City does not have any existing land rights. The City would need to acquire additional land rights from adjacent properties to make drainage conveyance improvements.

OPTIONS ELIMINATED

The two widest channel options were eliminated from consideration based on the initial analysis: the 380-foot earthen channel and the 460-foot earthen channel with levees. The remaining channel options were further evaluated by reach based on the available City land rights. These options are listed below.

POTENTIAL IMPROVEMENT OPTIONS BY REACH

The following options are being considered along each reach of Reata Wash. Please note these are the options that are technically feasible but may not represent the most cost-effective or publicly-acceptable solution. These options will be further refined and a preferred flood control alternative will be recommended to Council for consideration. The recommendation will be based on an analysis of the cost, technical and environmental considerations and the community's input.

REACH 5 (CENTRAL ARIZONA PROJECT TO BELL ROAD)

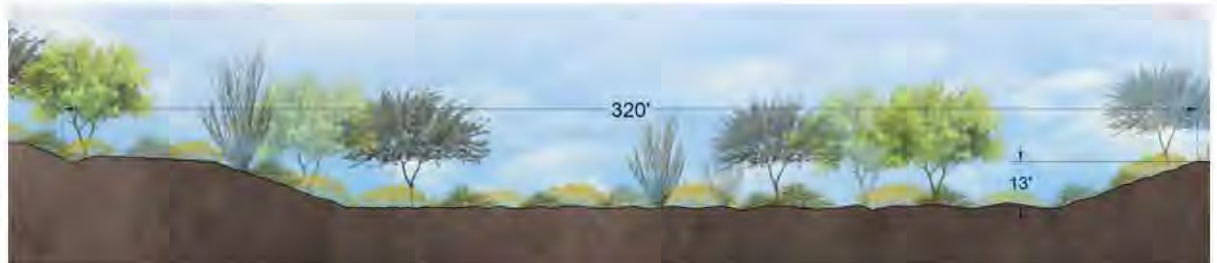
Improvements are needed along the entire reach and include:

- Channel improvements: New earthen channel with buried bank protection.
- A new concrete drop structure, which helps reduce erosion.
- A new sediment basin to collect the sediment from the drainage corridor.

KEY MAP



EARTHEN CHANNEL

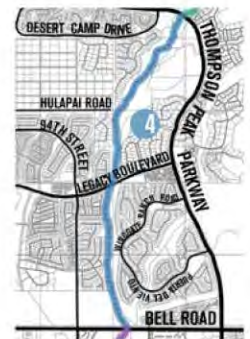


REACH 4 (BELL ROAD TO THOMPSON PEAK PARKWAY)

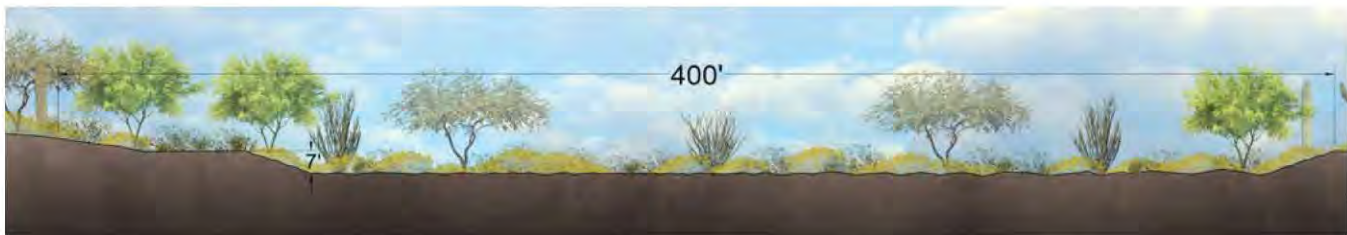
The majority of this reach has an existing earthen channel. Additional field investigations are needed along some locations of the existing channel to determine if it meets FEMA guidelines for flood protection. Minor updates to some existing flood control structures along the drainage corridor will be needed to meet FEMA guidelines. These include:

- Increasing the height of the existing Bell Road levee by approximately 1 foot.
- An increase in levee height or new floodwalls in other locations.
- Additional buried bank protection along some sections of the wash to create stable side banks.

KEY MAP



EXISTING EARTHEN CHANNEL

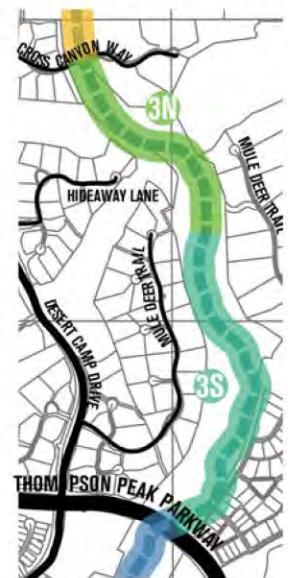


REACH 3 (THOMPSON PEAK PARKWAY TO CROSS CANYON WAY)

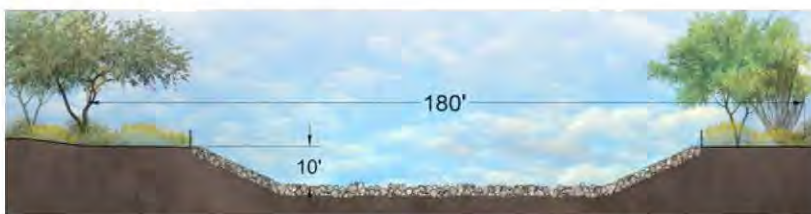
The southern part of this reach has an existing earthen channel. Minor improvements will be needed along the channel to meet FEMA guidelines, including new buried bank protection along the west bank, and updates to the existing buried bank protection on the east bank. The wash channel along the northern part of this reach needs to be improved and connected with improvements in Reach 2 to the north. The following channel options are being considered in the northern section of Reach 3:

- A new Covered Box Culvert.
- A new Concrete U-Channel.
- A new Grouted Rock Channel.

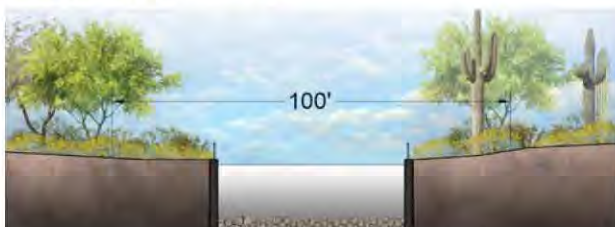
KEY MAP



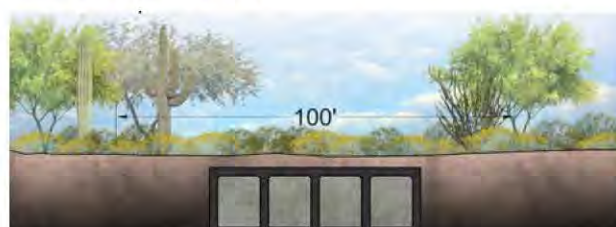
OPTION A: GROUTED ROCK CHANNEL (NORTH) LOWEST COST



OPTION B: U-CHANNEL (NORTH) 1.6 X MORE \$ THAN A



OPTION C: BOX CULVERT (NORTH) 2.3 X MORE \$ THAN A



REACH 2 (CROSS CANYON WAY TO PINNACLE PEAK ROAD)

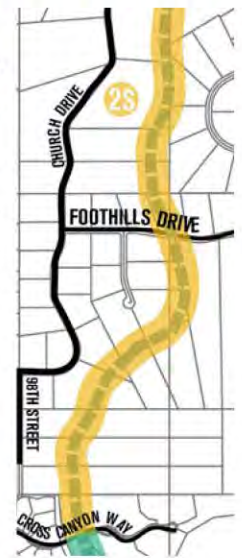
No flood control structures currently exist in Reach 2, and improvements are needed along the entire reach. Different options are being considered in the southern and northern sections of Reach 2, based on the existing City land rights. In the northern section, the City has 100 feet (width) of land rights. In the southern section, additional land rights would need to be acquired for the potential improvements. The following options are being considered in Reach 2:

- A new Covered Box Culvert – Option for Reach 2 north and south.
- A new Concrete U-Channel – Option for Reach 2 north and south.
- A new Grouted Rock Channel – Option for Reach 2 south only.

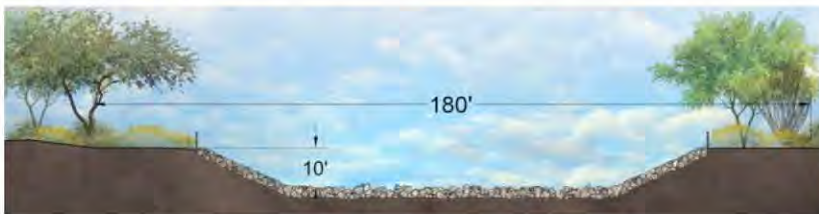
KEY MAP: NORTH



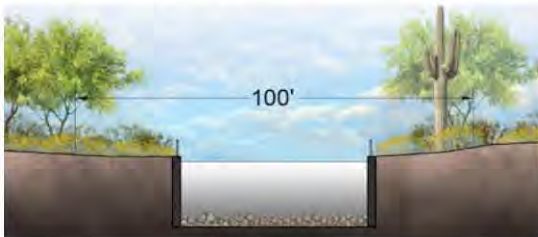
KEY MAP: SOUTH



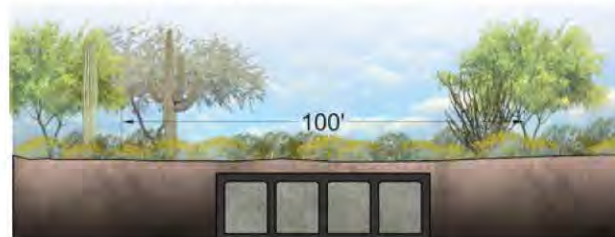
OPTION A: GROUTED ROCK CHANNEL (SOUTH) LOWEST COST



OPTION B: U-CHANNEL (NORTH & SOUTH) 1.6 X MORE \$ THAN A



OPTION C: BOX CULVERT (NORTH & SOUTH) 2.3 X MORE \$ THAN A



This area also includes the Dobson Wash. An outlet structure is proposed to maintain stormwater flows in Dobson Wash to meet federal environmental regulations.

REACH 1 (NORTH OF PINNACLE PEAK ROAD)

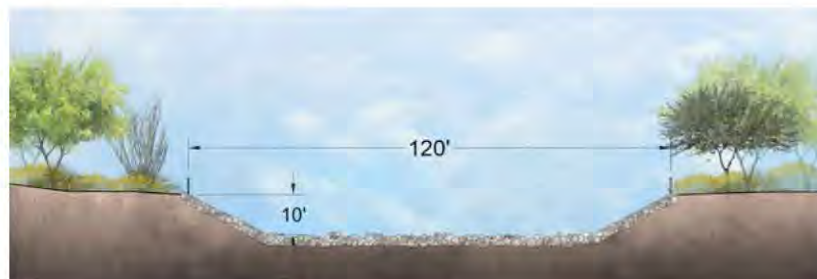
Some flood control structures exist in Reach 1, which is upstream of the Pinnacle Peak Road Bridge. Proposed improvements being considered include:

- A new Grouted Rock Channel.
- A new floodwall to direct stormwater into the channel.

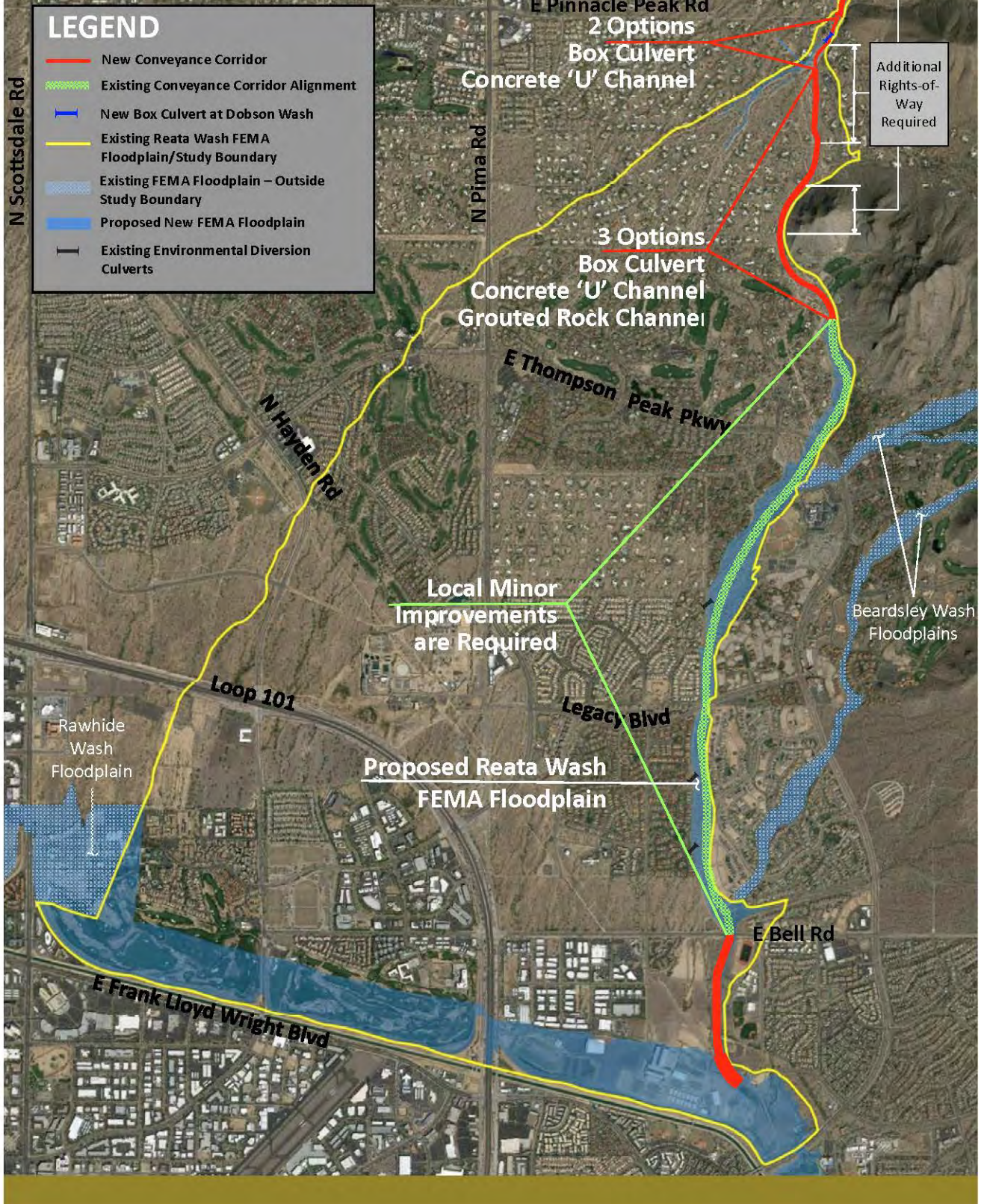
KEY MAP



GROUTED ROCK CHANNEL



Reata Wash Flood Control Improvement Study
City of Scottsdale
Proposed Flood Control Improvements with Existing
and Proposed FEMA Floodplains



ESTIMATED COST OF FLOOD CONTROL IMPROVEMENTS

A comprehensive flood control solution for Reata Wash is estimated to cost approximately \$47-69 million to design and construct. This cost does not include acquisition of land rights. The study team will prepare cost estimates for the flood control options, as well as a cost-benefit analysis of the recommended alternative.

There is no funding currently identified for any flood control improvements. If the Council recommends the study be moved forward as a project, funding would need to be identified and the Council would need to allocate any funds. The City would seek County, State and Federal funding partners for a project.

COMMUNITY BENEFITS OF FLOOD CONTROL IMPROVEMENTS

The overall benefits to the community will be evaluated along with the cost of a potential project.

Major benefits include:

- Reduction in flood risk to thousands of homes and businesses, as well as public buildings and public infrastructure. There are more than 4,600 public and private buildings and public infrastructure in the floodplain.
- Anticipated re-mapping of nearly all properties out of the existing Reata Wash FEMA regulatory floodplain. Approximately 80 structures would likely remain in the floodplain. This would eliminate the federal requirement for property owners with a federally-backed mortgage to purchase flood insurance. This would save property owners in the Reata Wash floodplain \$1.8 million annually in flood insurance premiums based on current rates.

- Increased public safety and improved access on roadways during storms.
- Reduced costs to the City to repair public infrastructure and clean up debris and sediment after major storms.

CRITERIA FOR FLOOD CONTROL IMPROVEMENTS

The following criteria will be used to determine a recommended flood control solution to Scottsdale City Council:

- A FEMA-compliant solution to reduce flood risk throughout the current FEMA floodplain.
- Maximize the acres and properties removed from the FEMA floodplain based on the reduced risk.
- Minimize adverse impacts to private properties.
- Compliant with environmental requirements.
- Context-sensitive and compatible with the character of the desert environment.
- Meet Flood Control District of Maricopa County (FCDMC) guidelines, as they will be a potential source of funding.
- Cost-effective design that maximizes the use of taxpayer funds.
- Acceptable to the community.

A comprehensive flood control solution will contain stormwater within Reata Wash and protect properties in the floodplain.



NEXT STEPS

The study team is seeking input from the community about these potential flood control options. Once that input is received, the team will complete additional technical and environmental evaluation of the options. Based on the technical analysis and community's input, the team will identify the recommended alternative for the Reata Wash corridor and prepare a design concept and cost analysis. Staff anticipates presenting the recommended alternative to City Council in late 2016 for its consideration and action.

COMMUNITY INVOLVEMENT AND OPPORTUNITIES FOR INPUT

The City held a public meeting in March 2016 to determine the importance of addressing flood risk in Reata Wash. The team has also been meeting with homeowners associations and other stakeholders to discuss the study and the flood control options being considered in their community. The majority of attendees said it is important to reduce flood risk and to reduce or eliminate the FEMA floodplain to eliminate the requirement for flood insurance. The City is holding a public meeting May 18, 2016 to seek the community's input on the flood control options currently being considered. All property owners in the Reata Wash floodplain were mailed a notice of the meeting.

If you were unable to participate in these meetings, you can visit the study web page or contact the study team for more information and to provide your input.



GET INVOLVED



For more information or to sign up for the study e-mail list to receive updates and notices of community meetings visit:
www.scottsdaleaz.gov, Search (Reata)


QUESTIONS OR COMMENTS


City of Scottsdale Stormwater Management
gtoth@scottsdaleaz.gov • 480.312.7328

4.5 Study Website Content and Online Evaluations

City of Scottsdale Website Study Information Page



 MENU

What are you looking for? 

Home Page / City Construction Projects / Reata Wash Flood Control Study

Reata Wash Flood Control Study

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Study Purpose

The purpose of the study is to identify and recommend flood control measures that will reduce flood risks to residents, property and public infrastructure. We will work with the community to develop a solution that is cost effective, sensitive to the environment, and compliant with federal regulations and guidelines. A secondary goal is to remove or reduce the size of the current floodplain designation.

Contact Information

City of Scottsdale - Capital Project Management
7447 E. Indian School Road
Scottsdale, AZ 85251
P: 480-312-7250

Greg Toth, CFM, Senior Stormwater Hydrologist
P: 480-312-7328
gtoth@scottsdaleaz.gov

1/13/16 Text for Website Sent to City of Scottsdale...

Reata Wash Flood Control Study

The Reata Wash floodplain encompasses a large area in north Scottsdale between approximately Pinnacle Peak Road and the Central Arizona Project Canal (see study area map). Approximately 30 years ago, the Federal Emergency Management Agency (FEMA) defined the 100 year Reata Wash floodplain based on the potential flood hazards identified.

There are more than 4,600 residential, public facilities and commercial structures located within the floodplain at potential risk of flooding. Property owners within the floodplain with a federally-backed mortgage are required to carry flood insurance through the National Flood Insurance Program (NFIP).

Study Purpose

The purpose of the study is to identify and recommend flood control measures that will reduce flood risks to residents, property and public infrastructure. We will work with the community to develop a solution that is cost effective, sensitive to the environment, and compliant with federal regulations and guidelines. A secondary goal is to remove or reduce the size of the current floodplain designation established by FEMA. This would eliminate or reduce the requirement for many property owners to purchase flood insurance through the NFIP.

Flooding Risks Identified

The Reata Wash floodplain poses significant flood risks to people, properties and infrastructure in north Scottsdale. The Reata Wash floodplain is a geologic alluvial fan feature where stormwater and sediment travel down irregular terrain and spread out unpredictably in a fan shape.

Properties and structures within the floodplain are at some risk of flooding from a major storm event. Flooding will vary depending on where the water spreads across the fan floodplain. In addition, several major transportation arterials – including Pima Road, Thompson Peak Parkway and Pinnacle Peak Road – are likely to be impassible and potentially damaged following a major storm.

Flood Control Gaps in Existing Infrastructure

Since the FEMA floodplain was designated, bridges, drainage and flood control structures have been built to reduce the risk of flooding. Despite these measures, “gaps” remain in the existing flood control infrastructure – in particular within the upper and lower portions of Reata Wash. Due to these gaps, additional FEMA-compliant solutions for reducing or eliminating the FEMA floodplain are needed.

Reata Wash has been divided into five segments – or reaches – for the study. Flood mitigation measures will be evaluated and recommended in each segment based on existing drainage infrastructure and severity of the flooding predicted.

Community Involvement and Opportunities for Input

Public involvement will be a key element of this study. Affected residents will be invited to participate in the study and help evaluate potential alternatives. Community and stakeholder input will be used to help decide which flood control mitigation measures are best suited for each portion of Reata Wash. The city recognizes the unique desert environment in this area, and any options that would be considered would be context-sensitive to be compatible with the surrounding environment as much as feasible. The city is not considering recreational or multi-use opportunities as part of any flood mitigation solution.

Several community and stakeholder meetings will be held throughout the course of the study. The study team will also meet with individual stakeholders, including homeowners’ associations, to review the options being considered.

Get Involved

Sign up for the study email list to receive updates and community meeting notices.

For questions or comments:

Greg Toth, CFM

City of Scottsdale, Senior Stormwater Hydrologist

gtoth@scottsdaleaz.gov | 480-312-7328

REATA WASH FLOOD CONTROL STUDY

FREQUENTLY ASKED QUESTIONS

Q. What is the Reata Wash Flood Control Study?

A. The City of Scottsdale is studying the Reata Wash floodplain to identify and recommend flood control measures to reduce flood risks to residents, property and public infrastructure. The Reata Wash floodplain encompasses a large area in north Scottsdale between approximately Pinnacle Peak Road and the Central Arizona Canal (CAP). See the study area map below. Approximately 30 years ago, the Federal Emergency Management Agency (FEMA) designated the 100 year Reata Wash floodplain.

There are more than 4,600 residential, public facilities and commercial structures located within the floodplain at potential risk of flooding in accordance with FEMA guidelines. Property owners within the floodplain with a federally-backed mortgage are required to carry flood insurance through the National Flood Insurance Program (NFIP).

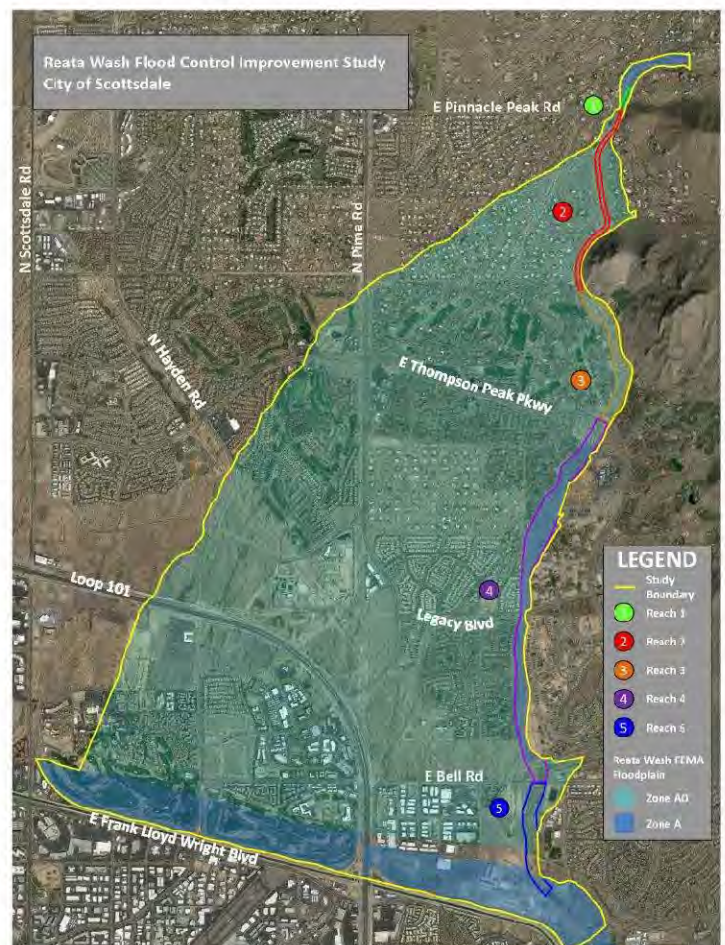
Q. Is my property located in the study area?

A. The study area boundaries are shown on the map below. The study area generally corresponds to the existing Reata Wash FEMA regulatory floodplain, which is shaded in blue. Reata Wash – the watercourse that creates the floodplain – lies on the eastern boundary of the study area.

Q. What is the purpose of the study?

A. The purpose of the study is to identify and recommend flood control measures to reduce flood risks to residents, property and public infrastructure. We will work with the community to develop a solution that is cost effective and compliant with federal regulations and guidelines.

A secondary goal is to remove or reduce the size of the current floodplain designation established by FEMA. This would eliminate or reduce the requirement for many property owners to purchase flood insurance through the NFIP. The floodplain re-mapping (known as re-delineation) would need to be conducted after flood control measures are constructed to demonstrate to FEMA that the current flood risk has been eliminated or reduced to specific properties in the floodplain.



Q. Why do we need this study?

A. The Reata Wash floodplain poses significant flood risks to people, properties and infrastructure in north Scottsdale. This is due to the geography of the area and the type of flooding that occurs here during storm events. The Reata Wash floodplain is an alluvial fan which is a geologic feature where stormwater and sediment travel down irregular terrain and spread out unpredictably across the fan depositing sediment.

Properties & structures within the floodplain are at risk of flooding from a major storm event. Flooding will vary depending on where the water spreads across the floodplain fan. In addition, several major transportation arterials – including Pima Road, Thompson Peak Parkway and Pinnacle Peak Road – are likely to be impassible and potentially damaged as the result of a major storm.

Q. Why are Reata Wash and the associated floodplain hazardous?

Stormwater flows in Reata Wash travel at high speeds from nearby mountains and are concentrated through narrow washes at the upper portion of the wash. During a 100-year storm event (approximately 4-5 inches of rainfall in less than 24 hours), it is anticipated that 13,000 cubic feet of water per second will flow down from the mountains and travel through Reata Wash near Pinnacle Peak Road.

As the water moves downstream the land flattens, causing the water to spread out over larger areas. Within an alluvial fan floodplain the channels are shallow which allows the water to break out of the channel banks and create new channels.

Stormwater flows do not distribute evenly across the fan during any storm. The locations where water breaks out of the channel will determine which of the structures in the floodplain would be at risk from flooding during an individual storm. Each storm could result in a different water flow, causing different areas of the floodplain to be at risk.

Q. Where is flood control needed in Reata Wash?

A. Since the FEMA floodplain was designated, bridges, drainage and flood control structures have been built to reduce the risk of flooding. Despite these measures, “gaps” remain in the existing flood control infrastructure – in particular within the upper and lower portions of Reata Wash. Due to these gaps, additional FEMA-compliant solutions for reducing or eliminating the FEMA floodplain are needed.

Q. Why are areas of the wash divided into segments? Are you talking about building something in each of these areas?

A. Reata Wash has been divided into five segments – or reaches – for the study. Flood mitigation measures will be evaluated and recommended in each segment based on existing drainage infrastructure and severity of the flooding predicted. The city recognizes the unique desert environment in the study area, and any options that would be considered would be context-sensitive to be compatible with the surrounding environment as much as feasible. The city is not considering recreational or multi-use opportunities as part of any flood mitigation solution.

Q. I have lived here more than 20 years and my property has never flooded – even in the big storms that hit the Valley last year. Why do we need to look at flood control here?

A. While other parts of the Phoenix metropolitan area had flooding in the historic August and September 2014 storm events, it may surprise you to learn that these were not 100-year storms in the Reata Wash area. A 100-year storm has a 1 percent chance of occurring in any given year and is the equivalent of approximately 4-5 inches of rainfall in less than 24 hours. The rainfall recorded in Reata Wash during the September 8, 2014 storm was 2.28 inches, which is the equivalent of approximately a 25-year storm event. There has not been 100-year storm rainfall levels recorded in the study area since rain gages were installed approximately 14 years ago.

Q. If the FEMA floodplain can be reduced in size, would my property be removed from the floodplain? If I am no longer in the FEMA floodplain, can I stop paying for flood insurance?

A. Due to the type of flooding in Reata Wash, FEMA will likely not approve re-mapping the floodplain (known as re-delineation) until flood control measures are constructed to demonstrate to FEMA that the current flood risk has been eliminated or reduced to specific properties in the floodplain. It is anticipated that flood control measures would remove the majority of the existing FEMA floodplain designation. Owners whose properties are no longer located in the floodplain may not be required by their mortgage company to carry flood insurance through the National Flood Insurance Program (NFIP). However, floodplain re-mapping is a lengthy process that can take several years for FEMA to complete.

Q. FEMA is confusing to me. Please explain the City's relationship with this Federal agency.

A. The City of Scottsdale elects to participate in the NFIP sponsored by FEMA. The NFIP provides affordable, federally-subsidized flood insurance for property owners. As a condition to participate in the program, local communities must adopt and enforce floodplain management regulations to reduce or avoid future flood losses by FEMA. These regulations help mitigate flooding to new and improved structures, as well as to existing adjacent properties within the floodplain. This is accomplished through special building permit requirements for properties in the floodplain, maintenance of existing city-owned drainage, and enforcement. The city is not involved in flood insurance programs, including setting flood insurance premium rates.

Q. My house is elevated and I don't think I need flood insurance, but my mortgage lender requires it. Can I appeal this if I think it is incorrect?

A. Structures that are located within a FEMA designated floodplain and have a federally-insured mortgage, are required (as part of the NFIP program) to purchase flood insurance. This requirement is administered through their lending institution. It should be noted that some lending institutions require insurance for properties not located within a designated FEMA floodplain. The NFIP has an appeal process that provides flood insurance policyholders with the option to dispute a decision. The City of Scottsdale Stormwater Management Office can also be contacted to determine if an elevation certificate is on record for the structure. In order to advance an appeal, the appeal must be based on new technical information that is FEMA compliant.

Q. Has the city ever been involved with a similar study or flood control project?

A. The city often partners with the Flood Control District of Maricopa County (FCDMC) to conduct Area Drainage Master Studies which identify the flooding risks within watersheds. The Pinnacle Peak West Area Drainage Master Study (led by the FCDMC) is evaluating potential flood control options for flooding hazards identified in the Rawhide Wash floodplain located just west of the Reata Wash floodplain.

Q. Where can I get more information?

A. For more information and to sign up for the project email list to receive notifications of upcoming meetings visit the study web page at:

www.scottsdaleaz.gov, Search (Reata)

You may also contact City of Scottsdale study team staff:

Greg Toth, CFM, Senior Stormwater Hydrologist
gtoth@scottsdaleaz.gov or 480-312-7328

Q. How can I provide input on the study and possible flood mitigation options?

A. Public involvement will be a key element of this study. Affected residents will be invited to participate in the study and help evaluate potential alternatives. Community and stakeholder input will be used to help decide which flood control mitigation measures are best suited for each portion of Reata Wash. The city recognizes the unique desert environment in this area, and any options that would be considered would be context-sensitive to be compatible with the surrounding environment as much as feasible. The city is not considering recreational or multi-use opportunities as part of any flood mitigation solution.

Several community and stakeholder meetings will be held throughout the course of the study. The study team will also meet with individual stakeholders, including homeowners' associations, to review the options being considered.

Glossary of Terms

What is the "100-year flood"?

Federal Emergency Management Agency (FEMA) provides the following definition: The term "100-year flood" is used in an attempt to simplify the definition of a flood that statistically has a 1 percent chance of occurring in any given year.

The Arizona Department of Water Resources (ADWR) provides the following definition: 1-Percent-Annual Chance Flood: The flood that has a 1 percent chance of being equaled or exceeded in any given year.

What is alluvial fan flooding?

Federal Emergency Management Agency (FEMA) provides the following definition: Flooding occurring on the surface of an alluvial fan or similar landform which originates at the apex and is characterized by high-velocity flows, active processes of erosion, sediment transport, and deposition, and unpredictable flow paths.

Arizona Department of Water Resources (ADWR) provides the following definition: Flooding that occurs only on alluvial fans and is characterized by flow path uncertainty so great that this uncertainty cannot be set aside in realistic assessments of flood risk or in the reliable mitigation of the hazard. An active alluvial fan flooding hazard is indicated by three related criteria: (1) flow path uncertainty below the hydrographic apex; (2) abrupt deposition and ensuing erosion of sediment as a stream or debris flow loses its ability to carry material eroded from a steeper, upstream source area; and (3) an environment where the combination of sediment availability, slope, and topography creates an ultra-hazardous condition for which elevation on fill will not reliably mitigate the risk.

Q. What is an A and AO flood zone?

A. Zone AO depicts a certain type of flooding (alluvial fan flooding) on a Flood Insurance Rate Map (FIRM), and is shown along with a flood depth and velocity. Therefore a flood zone of A03 means an average flood depth of 3 feet is occurring in that portion of the fan. A velocity measured in feet per second (fps) is also displayed on flood insurance maps in conjunction with a flood zone. Within Reata Wash, the following flood zones are in place: Zone AO and Zone A. Within the AO flood zone, there are three sub-zones: Zone A03 with a velocity of 8 fps and 9 fps, Zone A02 with a velocity of 6 fps and 7 fps, and Zone A01 with a velocity ranging from 3 fps to 5 fps. The deeper, faster-moving flood waters occur in the upper fan area near Pinnacle Peak Road. The shallower, slower moving flood waters are found downstream as the fan spreads out. In Zone A, no flood depths are shown because detailed hydraulic analyses have not been performed in these areas. However, these areas are subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies.

Q. What is a Conditional Letter of Map Revision (CLOMR)?

A Conditional Letter of Map Revision (CLOMR) is a Federal Emergency Management Agency (FEMA) decision to a community request for FEMA's approval regarding proposed alterations to the floodplain delineation within the community. The CLOMR documents and describes the effect of the proposed project, if constructed as proposed, on the effective or current FEMA floodplain delineations. A CLOMR contains detailed information on conditions that must be met by the community before FEMA will issue a final determination regarding revising the effective or current FEMA floodplain delineations.

Q. What is a Letter of Map Revision (LOMR)?

A Letter of Map Revision (LOMR) is an official determination by Federal Emergency Management Agency (FEMA) that a property has been removed from the effective or current floodplain delineation. Removal of property is generally based on placement of earth fill, construction of levees or other flood control structures, or more advanced technical information applicable to the watershed creating the FEMA floodplain. Upon satisfying FEMA requirements, an approval letter is issued by FEMA.

LIST OF ACRONYMS

AO Zone	Alluvial Fan Flood Hazard Zone
ADWR	Arizona Department of Water Resources
CFS	Cubic Feet Per Second
CLOMR	Conditional Letter of Map Revision
FCDMC	Flood Control District of Maricopa County
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FPS	Feet Per Second
LOMA	Letter of Map Amendment
LOMR	Letter of Map Revision
NFIP	National Flood Insurance Program
PPS ADMS	Pinnacle Peak South Area Drainage Master Study



Reata Wash Flood Control Study

Phase 2 Online Evaluation of Options

Overview

Following the second public meeting for the Reata Wash Flood Control Study held on May 18, 2016, the meeting presentation and evaluation form was posted online. On May 26, 2016, an email was sent to 226 people in the project stakeholder list announcing the online evaluation and encouraging residents who could not attend the meeting or who had not returned the evaluation form to participate online.

Fifteen people participated online. Some only provided comments and did not complete the evaluation form.

Online Comments

The following are the verbatim comments submitted online. If the person indicated the comment was related to a specific reach, the reach is identified following the comment.

- We moved from the area of 91st St, Cholla, Cactus, and 92nd St. which had flood control culverts, etc. built. I watched the progress, as I would run near there daily. I saw how it helped in major storms to carry the rainwater. I live now in areas with many washes and see them daily as I run. I know how important the flood control measures are, but also value highly the natural areas. I hope the flood control measures can be built so that the land will be able to heal to as natural as possible afterwards. (Reach 4)
- The financial return does not justify this investment at all. The average flood insurance annual cost for the impacted homes is approximately \$400, borne by the homeowners who have chosen to build their (luxury) homes in that area. There are more important financial priorities in Scottsdale than this program. (Reach 4)
- We are concerned about the flood control system and how it might affect us, but please also review the amount of brush there is growing in each reach and the chance of fire. Is the City doing anything to address both issues? (Reach 4)
- I do not like any part of it-It is not necessary (Reach 1)
- Flood insurance too expensive and getting more costly each year. This study could help bring an end to this burden, especially for retired folks on a fixed income.
- There has not been any REAL economic analysis of the need for this project. Until we are convinced that this is an "economically justified project for the citizens of Scottsdale" and not a handout to developers who then can sell homes without the buyers who need financing having to purchase flood insurance, (which is seriously underpriced because the federal government doesn't want to make it a neutral benefit ((i.e., it is heavily government subsidized))), there will be little voter support.
- I am not qualified to answer survey questions on desert or wildlife impact but in the interests of fiscal propriety would be prepared to support the most cost effective means of reducing the FEMA flood plain. (Reach 4)

- The project needs to be as minimally invasive and intrusive as possible. It should cost as little as possible, and MUST be matched by the businesses that are benefiting from this - the residents all have insurance already, this whole project is primarily to allow the businesses at Pima and Princess to get insurance. They need to pay an impact fee. Without making the businesses pay an impact fee, this is nothing more than a government handout to Lane's buddies. Additionally, you must create drainage for Westworld. All the water will be further directed into that basin. Currently that becomes a stagnant lake for weeks at a time after a rain. There must be drainage to run that water out. (Reach 5)
- The engineers appear to be doing a capable job with this. Appreciate your reach-out to the "Reaches." (Reach 1)
- All of the solutions being considered are acceptable to me, with a "natural appearing" option being the most desirable. However, given that making the most cost-effective choice is also important, I understand that a concrete channel may be selected. My only desire is that if a concrete channel ends up being the selected option that the city would seek ways to make the channel appearance as aesthetically pleasing as possible. Textured materials in a portion of it, if feasible? My thinking is that if the appearance of the structure ends up being more man-made than "natural," that we seek a way to make it an aesthetic, man-made enhancement that somehow can complement nature and not appear to be a big hunk of mitigation plunked into our beautiful desert foothills. (Reach 4)
- Do not understand why some houses on this block are rated AO and we have to buy flood insurance while other houses on the same block, as well as other houses in the area, are rated A and do not have to buy flood insurance. Appears that after the flood issues in New Orleans the Federal Government Corps of Engineers have gotten carried away and over compensated. The flood plain needs to reflect reality and after several discussions with City of Scottsdale engineers it appears extremely unlikely that any watershed north of our house could create any type of flood situation for us. The Core of Engineers has succeeded in creating an unnecessary financial stream for the insurance companies at the expense of the property owners. This should be corrected immediately. (Reach 1)
- We feel it is very important that this updated study is done. The existing guidelines are based on very old maps/data. While there hasn't been any severe loss due to flooding in this area, there is certainly the chance that this could happen, and so there is a need for greater protection. (Reach 4)
- City of Scottsdale and its citizens should do everything possible to make our area safe from any serious flooding. DC Ranch is a huge population to this City and we support a great deal with our tax base so I believe it is important to do any and all updates necessary to be compliant. We should not have to purchase flood insurance and more importantly be worried about losing our homes to a flood when this situation has existed for way too long. (Reach 4)
- On March 28th, I filed a LOMC for my property with FEMA - I am awaiting their response. The flood insurance paid on our properties is ridiculous and support the study so we can address any flood issues and remove these properties from the flood zones. (Reach 5)
- When will Reach 4 be complete?

Online Evaluation of Flood Control Options (Completed After Meeting)

Fifteen people completed an evaluation of the flood control options via the City website following the public meeting. Residents were notified by email and given until June 8, 2016 to participate. Some respondents did not score all of the alternatives. The actual number of responses for each option is shown in the table below.

In Reach 2, all three of the options received an average score of 7.7 or 8.0 with no clear preferences. In Reach 3, the covered box channel was the highest score of 9.3 and the grouted rock and u channel options scoring 6.8 and 6.5.

Evaluation Criteria	Reach 1	Reach 2 N / S A - Grouted Rock Channel	Reach 2 N / S B - U channel	Reach 2 South C - Covered Box channel	Reach 3 North A - Grouted Rock	Reach 3 North B - U Channel	Reach 3 North C - Covered Box Channel	Reach 3 South	Reach 4	Reach 5
Minimizes impacts to private properties.	13	10	11	14	8	7	11	8	14	14
Compatible with the character of the desert.	12	9	10	11	7	5	9	8	15	16
Minimizes impacts to wildlife and the environment.	13	10	10	11	7	5	9	7	18	16
Cost-effective design.	17	13	7	3	10	4	2	7	17	14
Acceptable to the community.	15	12	10	9	9	5	6	8	17	16
Total	70	54	48	48	41	26	37	38	81	76
Number of Responses	8	7	6	6	6	4	4	4	9	8
Average	8.8	7.7	8.0	8.0	6.8	6.5	9.3	9.5	9.0	9.5

4.6 Information Sent to HOAs

Sent Public Meeting Notice (Electronic Postcard) to HOAs on 2/5/16:

- 1) Bent Tree Desert Estates Homeowner's Association
- 2) DC Ranch HOA
- 3) Estancia Community Association
- 4) Grayhawk Community Association
- 5) Happy Valley Ranch Homeowner's Association
- 6) Ironwood Village HOA
- 7) La Vista at Pinnacle Peak HOA
- 8) Ladera Vista Homeowner's Association
- 9) Pinnacle Paradise Homeowner's Association
- 10) Pinnacle Peak Estates
- 11) Pinnacle Peak Estates Unit 1 Homeowners Association
- 12) Pinnacle Peak Shadows HOA
- 13) Pinnacle Peak Villas HOA
- 14) Pinnacle Reserve
- 15) Pinnacle Reserve Homeowner's Association
- 16) Tierra Bella Community Association
- 17) Troon North Homeowners Association
- 18) Vistana Homeowners Association
- 19) Windgate Ranch HOA

Reata Wash Flood Control Study

Article for HOAs to announce study and public meeting

The City of Scottsdale is studying the Reata Wash floodplain to identify and recommend flood control measures to reduce flood risks to residents, property and public infrastructure. The Reata Wash floodplain encompasses a large area in north Scottsdale between approximately Pinnacle Peak Road and the Central Arizona Canal (CAP).

The purpose of the study is to identify and recommend flood control measures that will reduce flood risks to residents, property and public infrastructure. A secondary goal is to remove or reduce the size of the current floodplain designation established by FEMA. This would eliminate or reduce the requirement for many property owners to purchase flood insurance through the National Flood Insurance Program.

Community Meeting

The City is holding a community meeting for the study. The meeting will be held:

Wednesday, March 2

5:30 – 7:30 p.m., presentation at 6 p.m.

Copper Ridge School, Cafeteria

10101 E. Thompson Peak Pkwy., Scottsdale

The purpose of the meeting is to:

- Provide information about flood risks to residents, properties, public buildings and streets in the Reata Wash floodplain.
- Provide input on possible flood control strategies to reduce the community's flood risk, which could remove or reduce the size of the current FEMA floodplain designation.

For more information about the study or to sign up for the study email list contact City of Scottsdale Stormwater Management at 480.312.7328, or go online to www.scottsdaleaz.gov and search Reata.



Social media posts

Facebook

The City of Scottsdale will hold a public meeting for the Reata Wash Flood Control Study on March 2 from 5:30-7:30 pm. at Copper Ridge School, 10101 E. Thompson Peak Pkwy., Scottsdale. Community members can learn about flood risks to residents, properties and public facilities in the Reata Wash floodplain, and provide input on possible strategies to reduce flood risk. The Reata Wash floodplain encompasses a large area in north Scottsdale between approximately Pinnacle Peak Road and the Central Arizona Canal (CAP). For more information about the study or to sign up for the mailing list, visit www.scottsdaleaz.gov and search Reata. [Insert study map]

Twitter

Public mtg- Reata Wash Flood Control Study 3/2 5:30-7:30 p.m., Copper Ridge School, discuss flood risks & flood control strategies. www.scottsdaleaz.gov-Reata

HOAs Sent Me

FULL_NAME	ORGANIZATION
Christine Irish	DC Ranch HOA
Michael Fee	Grayhawk Community Association
Mark Kunkel	Estancia Community Association
Unknown Unknown	Bent Tree Desert Estates Homeowner's
Stew Feldstein	Tierra Bella Community Association
Rudy Frame	Happy Valley Ranch Homeowner's Ass
Rudy Frame	Vistana Homeowners Association
Unknown Unknown	Pinnacle Peak Shadows HOA
John Wahman	Pinnacle Reserve
John Torres	La Vista at Pinnacle Peak HOA
J. Nelson	Pinnacle Peak Villas HOA
Jeff Sibbach	Windgate Ranch HOA
Blanche Prokes	Ladera Vista Homeowner's Association
D. Batchik	Ironwood Village HOA
Unknown Unknown	Pinnacle Peak Estates
Coleen West	Pinnacle Peak Estates Unit 3 HOA
Arianne Ahlvin	Troon North Homeowners Association
Trisha Morrison	Pinnacle Peak Estates Unit 1 Homeown
Jerry Fregien	Pinnacle Peak Estates Unit 2
Linda Benedetti	Pinnacle Peak Estates Unit 2 HOA Sec

City of Scottsdale to hold community meeting May 18 for Reata wash flood control options

The City of Scottsdale is holding a community meeting to review and seek the community's input on potential options to reduce flood risk in the Reata Wash floodplain.

The meeting will be held:

Wednesday, May 18

5:30 – 7:30 p.m.

Copper Ridge School, Cafeteria

10101 E. Thompson Peak Pkwy., Scottsdale

The Reata Wash floodplain encompasses a large area in north Scottsdale between approximately Pinnacle Peak Road and the Central Arizona Canal (CAP).

The purpose of the study is to identify and recommend flood control measures that will reduce flood risks to residents, property and public infrastructure. A secondary goal is to remove or reduce the size of the current floodplain designation established by FEMA. This would eliminate or reduce the requirement for many property owners to purchase flood insurance through the National Flood Insurance Program.

For more information about the study or to sign up for the study email list contact City of Scottsdale Stormwater Management at 480.312.7328, or go online to www.scottsdaleaz.gov and search Reata.



Social media posts

Facebook

The City of Scottsdale will hold a public meeting on May 18 to present potential flood control options to reduce flood risk to residents in the Reata Wash floodplain. The meeting will be held from 5:30-7:30 pm. at Copper Ridge School, 10101 E. Thompson Peak Pkwy., Scottsdale. The Reata Wash floodplain encompasses a large area in north Scottsdale between approximately Pinnacle Peak Road and the Central Arizona Canal (CAP). For more information about the study or to sign up for the mailing list, visit www.scottsdaleaz.gov and search Reata. [Insert study map]

Twitter

Public mtg-Reata Wash Flood Control Study 5/18 5:30 p.m., Copper Ridge School, review options to reduce flood risk. www.scottsdaleaz.gov-Reata

4.7 E-Mail Updates Sent to Distribution List

Email to study distribution list sent 5/3/16

Reata Wash Flood Control Study

JOIN US FOR A COMMUNITY MEETING TO:

Review and seek public input on potential options to reduce the community's flood risk and remove or reduce the size of the current FEMA floodplain designation.

Wednesday, May 18, 2016

5:30-7:30 p.m., presentation at 6 p.m.

Copper Ridge School, Cafeteria

10101 E. Thompson Peak Pkwy., Scottsdale

MORE INFORMATION

City of Scottsdale Stormwater Management

480.312.7328

www.scottsdaleaz.gov, Search "Reata"

Theresa Gunn

From: City of Scottsdale <ewalsh=scottsdaleaz.gov@mail185.atl101.mcdlv.net> on behalf of City of Scottsdale <ewalsh@scottsdaleaz.gov>
Sent: Thursday, May 26, 2016 5:27 PM
To: Daina Mann
Subject: Couldn't Attend the Reata Wash Public Meeting? You Can Still Provide Input on Flood Control Options

Provide your input on flood control options

[View this email in your browser](#)



Take Our Online Survey to Provide Input on Flood Control Options Presented at the Public Meeting

Couldn't attend our Reata Wash public meeting last week? Or did you attend and haven't yet returned your comment form?

Meeting materials and a survey to provide input on the flood control options being considered are now on the [Reata Wash web page](#).

We encourage you to visit the page to learn more and provide your input to help the City understand the community's preferences and determine the best way to proceed.

The online comment form will be available through June 8.

For more information, contact the study team.

MORE INFORMATION

City of Scottsdale Stormwater Management

480.312.7328

[Study web page](#)



Capital Project Management

7447 E. Indian School Road, Suite 205

Scottsdale, AZ 85251

Want to change how you receive these emails?

You can [update your preferences](#) or [unsubscribe from this list](#)

Reata Wash Email Distribution List

Christian Aguirre
Arianne Ahlvin
Popy Amanatidis
Linda Ambrose
Andy Andrews
Marilyn & Don Andrews
Mike & Yolanda Baker
James Ball
Nerijus Baronas
D. Batchik
Donita Beckham
Margo Bellock
Linda Benedetti
John Bergmann
Lois Bills
Susan Bitter Smith
Spencer Bolen
John Bommarito
Leslie Brun
Katherine Burley
Jay Byron
Francois & Maria Castaing
Vicki Casteel
Jeremy & Vicki Casteel
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Linda & Mark Eberle
Mark Edelman
Scot Edwards
Gail Ellenbecker
David & Leenie Erger
Deborah Farr
John W. Farr
Michael Fee
Stew Feldstein
Dave Fergus
Noreen Finchum
Scott Finkelmeyer
Lois Foulds
Rudy Frame
Denis Frank
Diana Frankowski
Charley Freericks
Jerry Fregien

Barbara Friedman
Dan Frigard
Linda Frigard
Wayne Gile
Laura & Mark Gilliland
James M. Gmelich
Pat & Jim Goessling
Susan & Tom Grace
Julie Grimmett
Constance Grunfeld
Joseph Guida
Melinda Gulick
Judy Hall
Matt Halverson
Linda & Mark Hannen
Paul Harper
Paul Harper
Christine Hatfield
George Haugen
Peter Haverkamp
Sam Hawkins
Tom Headley
Jill Hegardt, AICP
JD & Judy Helms
John Henrickson
Don Hofman
Jim Hotchkiss
Danny Hum
Christine Irish
Betty Janik
Anne Jasper
Jim Jawor
Gordon Jensen
Nicola Johnston
Leslie Jones
Victoria Kauzlarich
Cliff Klima
Toni Klima
Frank Kohler
June & Jim Kollenda
Christine Kovach
Anthi Koviriwis
Mark Kunkel
David Kutz
Michael Langston
Mike Lawrence
Jody Leinenwerner
Robert Linden
Kathy Littlefield
Linda Lotter
Sheryl Lowenhar
R. Lukas
Neil Macalister
Daina Mann
Rocer Mann
Roger Mann
Ed Marklow
Scott Mars, PE
Gilbert Mauk
Alex McLaren
Lukas Miles
Lynn Miller
Mark Miller
Sandy Mills

Kevan Millstein
John P. Minieri
Renee Mishelof
Richard Mishelof
Becki Molt
Trisha Morrison
Kevin Moshir
Jeremy Mueller
Dennis Myers
J. Nelson
Dennis Newcombe
David Newell
CJ Newman
Robert Newman
Myron Newton
Ernie Nowlin
Cristina Ortiz
Gordon Parker
David Personne
Linda Peshkin
Joel Peterson
Theresa Pinto
Walter Priebe
Blanche Prokes
Marrene Puhlmann
Becky Rand
Bill Rau
Areleen Rau
Ralph & Gloria Reid
Massoud Rezakhani
Dale Robertson
Randy Rogers
Ralph Rossborough
Amy Santoni
Umberes Santoni
Glenda Saper
Craig & Ginger Schmersal
Helen Schmucker
Molly Schwarz
Jeff Sibbach
Jeff Sibbach
Matthew Smiley
Catha Smith
Greg & Maria Sorknes
Lolita Spiro
Jack Starkey
Alan Steffe
Ty Sterhan
Harlan Stratton
Todd Streiff
Shane Stuttle
Jack Sullivan
Ed Swanson
Jack & Pat Thomas
Robin Thomas
Dan Thompson
John Torres
Greg Toth
Martha Troy
Gregg Tryhus
Ed Turner
Jeff Turner
David Unknown
Lynne Unknown

[illegible]

4.8 Stakeholder Management System Contacts

EVENT_D	FULL_NAME	ORGANIZATION	TYPE_OF_C	ISSUE_COMMENTS
2/10/2016	Tiffany Davis	City Property Manager	Email	Daina Mann emailed Tiffany Davis the study information regarding the Ladera Vista HOA. Tiffany stated she does not manage the community. See attached email.
2/10/2016	Tiffany Davis	City Property Manager	Email	Tiffany replied to Daina's email, stating that she was unaware of who manages the Ladera Vista HOA. See attached email.
2/5/2016	Arianne Ahlvin	Troon North Homeowr	Email	Daina emailed HOAs within Reata Wash study area to inform them of the study and invite them to the March 2 public meeting. See Attachments.
2/5/2016	D. Batchik	Ironwood Village HOA	Email	Daina emailed HOAs within Reata Wash study area to inform them of the study and invite them to the March 2 public meeting. See Attachments.
2/5/2016	Michael Fee	Grayhawk Community	Email	Daina emailed HOAs within Reata Wash study area to inform them of the study and invite them to the March 2 public meeting. See Attachments.
2/5/2016	Stew Feldstein	Tierra Bella Communit	Email	Daina emailed HOAs within Reata Wash study area to inform them of the study and invite them to the March 2 public meeting. See attachments.
2/5/2016	Rudy Frame	Happy Valley Ranch H	Email	Daina emailed HOAs within Reata Wash study area to inform them of the study and invite them to the March 2 public meeting. See Attachments.
2/5/2016	Rudy Frame	Vistana Homeowners /	Email	Daina emailed HOAs within Reata Wash study area to inform them of the study and invite them to the March 2 public meeting. See Attachments.
2/5/2016	Janet Giannini	Ladera	Email	Daina emailed HOAs within Reata Wash study area to inform them of the study and invite them to the March 2 public meeting. See Attachments.
2/5/2016	Christine Irish	DC Ranch HOA	Email	Daina emailed HOAs within Reata Wash study area to inform them of the study and invite them to the March 2 public meeting. See Attachments. Christine replied to Daina's email, stating the most recent newsletter has already been published but that she would pass on the information. She also asked if this was related to what Susan Bitter Smith is presenting in an upcoming meeting. See attachment.
2/5/2016	Christine Irish	DC Ranch HOA	Email	this was related to what Susan Bitter Smith is presenting in an upcoming meeting. See attachment.
2/5/2016	Mark Kunkel	Estancia Community A	Email	Daina emailed HOAs within Reata Wash study area to inform them of the study and invite them to the March 2 public meeting. See Attachments.
2/5/2016	Trisha Morrison	Pinnacle Peak Estates	Email	Daina emailed HOAs within Reata Wash study area to inform them of the study and invite them to the March 2 public meeting. See Attachments.
2/5/2016	Trisha Morrison	Pinnacle Peak Estates	Email	Trisha replied to Daina's email and said she would pass the study information along to the board to approve prior to sending it to residents.
2/5/2016	J. Nelson	Pinnacle Peak Villas H	Email	Daina emailed HOAs within Reata Wash study area to inform them of the study and invite them to the March 2 public meeting. See attachments.
2/5/2016	Jeff Sibbach	Windgate Ranch HOA	Email	Daina emailed HOAs within Reata Wash study area to inform them of the study and invite them to the March 2 public meeting. See attachments.
2/5/2016	John Torres	La Vista at Pinnacle P	Email	Daina emailed HOAs within Reata Wash study area to inform them of the study and invite them to the March 2 public meeting. See Attachments.
2/5/2016	Unknown Unknown	Pinnacle Peak Shadow	Email	Daina Emailed HOAs Within Reata Wash Study Area To Inform Them Of The Study And Invite Them To The March 2 Public Meeting. See Attachments.
2/5/2016	Unknown Unknown	Estancia Community A	Email	Daina emailed HOAs within Reata Wash study area to inform them of the study and invite them to the March 2 public meeting. See attachments.
2/5/2016	Unknown Unknown	Pinnacle Peak Estates	Email	Daina emailed HOAs within Reata Wash study area to inform them of the study and invite them to the March 2 public meeting. See Attachments.
2/5/2016	Erin Waggener	Bent Tree Desert Esta	Email	Daina emailed HOAs within Reata Wash study area to inform them of the study and invite them to the March 2 public meeting. See Attachments.
2/5/2016	Erin Waggener	Bent Tree Desert Esta	Email	Jenee Peterson from AZCMS replied to Daina's emailed with the Bent Tree Community Manager's contact information.
2/5/2016	John Wahman	Pinnacle Reserve	Email	Daina emailed HOAs within Reata Wash study area to inform them of the study and invite them to the March 2 public meeting. See attachments.
3/18/2016	Arianne Ahlvin	Troon North Homeowr	Email	Daina sent an email with information regarding the upcoming public meeting (May 18) to review and seek input on possible flood control options. She included a fact sheet and map of the study area. See attachments.
3/18/2016	D. Batchik	Ironwood Village HOA	Email	Daina sent an email with information regarding the upcoming public meeting (May 18) to review and seek input on possible flood control options. She included a fact sheet and map of the study area. See attachments.
3/18/2016	Linda Benedetti	Pinnacle Peak Estates	Email	Daina sent an email with information regarding the upcoming public meeting (May 18) to review and seek input on possible flood control options. She included a fact sheet and map of the study area. See attachments.
3/18/2016	Stew Feldstein	Tierra Bella Communit	Email	Daina sent an email with information regarding the upcoming public meeting (May 18) to review and seek input on possible flood control options. She included a fact sheet and map of the study area. See attachments.
3/18/2016	Rudy Frame	Happy Valley Ranch H	Email	Daina sent an email with information regarding the upcoming public meeting (May 18) to review and seek input on possible flood control options. She included a fact sheet and map of the study area. See attachments.
3/18/2016	Rudy Frame	Happy Valley Ranch H	Email	Daina sent an email with information regarding the upcoming public meeting (May 18) to review and seek input on possible flood control options. She included a fact sheet and map of the study area. See attachments.
3/18/2016	Rudy Frame	Vistana Homeowners /	Email	Daina sent an email with information regarding the upcoming public meeting (May 18) to review and seek input on possible flood control options. She included a fact sheet and map of the study area. See attachments.
3/18/2016	Jerry Fregien	Pinnacle Peak Estates	Email	Daina sent an email with information regarding the upcoming public meeting (May 18) to review and seek input on possible flood control options. She included a fact sheet and map of the study area. See attachments.
3/18/2016	Mark Kunkel	Estancia Community A	Email	Daina sent an email with information regarding the upcoming public meeting (May 18) to review and seek input on possible flood control options. She included a fact sheet and map of the study area. See attachments.
3/18/2016	Trisha Morrison	Pinnacle Peak Estates	Email	Daina sent an email with information regarding the upcoming public meeting (May 18) to review and seek input on possible flood control options. She included a fact sheet and map of the study area. See attachments.
3/18/2016	J. Nelson	Pinnacle Peak Villas H	Email	Daina sent an email with information regarding the upcoming public meeting (May 18) to review and seek input on possible flood control options. She included a fact sheet and map of the study area. See attachments.
3/18/2016	Blanche Prokes	Ladera Vista Homeowr	Email	Daina sent an email with information regarding the upcoming public meeting (May 18) to review and seek input on possible flood control options. She included a fact sheet and map of the study area. See attachments.
3/18/2016	Jeff Sibbach	Windgate Ranch HOA	Email	Daina sent an email with information regarding the upcoming public meeting (May 18) to review and seek input on possible flood control options. She included a fact sheet and map of the study area. See attachments.
3/18/2016	Catha Smith	DC Ranch Community	Email	Daina emailed Catha information regarding Reata Wash Flood Control Study, including a map of the study area. See attachments.

3/18/2016	John Torres	La Vista at Pinnacle Pk	Email	Daina sent an email with information regarding the upcoming public meeting (May 18) to review and seek input on possible flood control options. She included a fact sheet and map of the study area. See attachments.
3/18/2016	Unknown Unknown	Pinnacle Peak Shadow	Email	Daina sent an email with information regarding the upcoming public meeting (May 18) to review and seek input on possible flood control options. She included a fact sheet and map of the study area. See attachments.
3/18/2016	Unknown Unknown	Pinnacle Peak Estates	Email	Daina sent an email with information regarding the upcoming public meeting (May 18) to review and seek input on possible flood control options. She included a fact sheet and map of the study area. See attachments.
3/18/2016	Erin Waggener	Bent Tree Desert Esta	Email	Daina emailed "support@azcms.com" with information regarding the upcoming public meeting (May 18) to review and seek input on possible flood control options. She included a fact sheet and map of the study area. See attachments.
3/18/2016	John Wahman	Pinnacle Reserve	Email	Daina sent an email with information regarding the upcoming public meeting (May 18) to review and seek input on possible flood control options. She included a fact sheet and map of the study area. See attachments.
3/18/2016	Coleen West	Pinnacle Peak Estates	Email	Daina sent an email with information regarding the upcoming public meeting (May 18) to review and seek input on possible flood control options. She included a fact sheet and map of the study area. See attachments.
3/2/2016	Anthony Coates		Comment For	See attached comment form from 3/2/16 meeting.
3/2/2016	Jim Davis		Comment For	See attached comment form from 3/2/16 meeting.
3/2/2016	Paul Harper		Comment For	See attached comment form from 3/2/16 meeting.
3/2/2016	Mel Steele		Comment For	See attached comment form from 3/2/16 meeting.
3/21/2016	Arianne Ahlvin	Troon North Homeowr	Email	Arianne replied to Daina's email regarding the second public meeting and said that she would include the meeting information on the Troon North website. See attached email.
3/22/2016	Lynn Miller		Phone Call	Theresa Pinto received a call from Lynn Miller and answered a couple general questions, such as the flood insurance question but he had more project specific concerns and questions. Theresa directed Lynn's more specific questions to Scott Mars and Greg Toth to follow up. See attached email with Lynn's questions.
3/24/2016	JD & Judy Helms		Email	Greg Toth emailed Mr. Helms regarding the voicemail he left Ashley Couch on 3/22/16 requesting elevation certificates. See attached email.
5/9/2016	JD & Judy Helms		Email	Greg Toth emailed JD Helms regarding the March 22 voicemail he left Ashley Couch and JD replied regarding the cost benefit analysis. See attached emails.
6/1/2016	Peter Haverkamp		Email	Peter emailed Greg Toth with several questions regarding the 2001 study and inquiring about 100 year flood examples in Reata. Greg answered Peter's questions-see attachment.
6/13/2016	Kyle Draper	The Country Club at D	Email	Kyle reached out to Greg seeking further information regarding the Reata Wash Study. Greg replied stating that he had been out of town and for Kyle to call him Monday. See attached email.
6/6/2016	Michael Langston		Email	Michael contacted Julie Cox in regards to paying flood insurance. Greg Toth returned Michael's call to assist with his concerns. See attachment.
6/6/2016	Michael Langston		Email	Julie Cox emailed Michael Langston to send the 100 yr storm maps as well as to indicate that Scott Mars will be reaching out to him. Nerijus followed up with Michael via phone. See attachment for details.
6/6/2016	Scott Mars, PE	City of Scottsdale	Email	Email from District (Julie Cox) to Scott Mars regarding a resident in Reata tired of paying flood insurance. See attachment.
6/8/2016	Susan Bitter Smith	Technical Solutions AZ	Email	Susan emailed Randy Grant and Scott Mars with an overview on the Reata Study thus far. See attachment.

APPENDIX E
MEMORANDUM: ENVIRONMENTAL

Reata Wash
Flood Control Improvement Study
Contract No. 2014-168-COS
Memorandum: Environmental
August 31, 2016

Prepared for:



Capital Project Management
7447 E. Indian School Rd. Suite 205
Scottsdale, AZ. 85251

Prepared By:



Logan Simpson
51 West Third Street, Suite 450
Tempe, Arizona 85281

In Association with:



TABLE OF CONTENTS

1. Executive Summary	vi
2. Introduction.....	1
2.1 Purpose of the Environmental Memorandum	1
2.2 Reata Wash Study Area Description.....	2
2.3 Previous Environmental Documentation	3
3. NEPA Overview.....	6
3.1 When is NEPA Compliance Required?.....	7
3.2 Role of Federal Agencies.....	7
3.3 Levels of NEPA Analysis.....	8
3.4 Agency Scoping and Public Involvement	10
3.5 Technical Resource Studies	10
3.6 Environmental Commitments and Mitigation.....	11
3.7 Record Keeping.....	11
4. Agency-Specific NEPA Processes	11
4.1 Bureau of Reclamation	12
4.1.1 Reclamation CEs	12
4.1.2 Reclamation EAs	13
4.1.3 Reclamation EISs	14
4.1.4 Agency Scoping and Public Involvement	14
4.1.5 Reata Wash Study Obligations and Recommendations	15
4.2 Federal Emergency Management Agency	15
4.2.1 Federal Emergency Management Agency Statutory Exclusions.....	16
4.2.2 Federal Emergency Management Agency CEs	16
4.2.3 Federal Emergency Management Agency EAs.....	16
4.2.4 Federal Emergency Management Agency EISs.....	17
4.2.5 Reata Wash Study Obligations and Recommendations	18
4.3 U.S. Army Corps of Engineers	18
4.3.1 U.S. Army Corps of Engineers CEs	18
4.3.2 U.S. Army Corps of Engineers EAs.....	19
4.3.3 U.S. Army Corps of Engineers EISs.....	19
4.3.4 Reata Wash Study Obligations and Recommendations	20



5.	Clean Water Act	20
5.1	Section 401	20
5.2	Section 402.....	21
5.3	Section 404.....	22
5.3.1	Jurisdictional Determinations	22
5.3.2	Nationwide Permits	23
5.3.3	Individual Permit	24
5.4	Reata Wash Study Obligations and Recommendations.....	25
5.4.1	Section 401	25
5.4.2	Section 402	25
5.4.3	Section 404	26
6.	Biological Resources.....	34
6.1	Endangered Species Act.....	34
6.2	Preliminary Review of the Reata Wash Study Area	35
6.2.1	Ecological Setting	35
6.2.2	Wildlife Movement	36
6.2.3	Special Status Species.....	36
6.2.4	ESA Compliance During a CLOMR Review.....	37
6.3	Reata Wash Study Obligations and Recommendations.....	37
7.	Cultural Resources	40
7.1	Reata Wash Study Obligations and Recommendations.....	40
8.	Summary	41
9.	References	42
10.	Relevant Laws, Regulations, Policies, and Executive Orders	45



LIST OF FIGURES

Figure 1. Reata Wash Study Area Vicinity Map.....	4
Figure 2. Reata Wash Flood Control Improvement Study Reaches.....	5
Figure 3. Location of Potential Waters of the U.S. of the U.S.....	28
Figure 4. Covered Box Culvert Illustration.....	31
Figure 5. Earthen Channel Corridor Illustration.....	31
Figure 6. Example Concrete Path for Wildlife Movement.....	39
Figure 7. "U" Channel Illustration.....	39

LIST OF TABLES

Table 1. Summary of Potential Reata Wash Study Obligations and Recommendations.....	Appendix A
Table 2. Approximate Acres of Potential Waters of the U.S. in Reata Wash Study Area.....	30
Table 3. Summary of Primary Federal and State Laws, Regulations, Policies, and Executive Orders Relevant to the Reata Wash Flood Control Improvement Study Area	54

APPENDICES

Appendix A. Table 1. Summary of Potential Reata Wash Study Obligations and Recommendations	
Appendix B. Arizona Game and Fish Department <i>Guidelines for Handling Sonoran Desert Turtles Encountered on Development Projects</i>	
Appendix C. Class I cultural resource inventory "A Class I Cultural Resources Inventory for the Reata Wash Flood Control Improvement Study, Scottsdale, Maricopa County, Arizona"	



LIST OF ACRONYMS AND ABBREVIATIONS

ADEQ	Arizona Department of Environmental Quality
ADWR	Arizona Department of Water Resources
AGFD	Arizona Game and Fish Department
ASM	Arizona State Museum
AZPDES	Arizona Pollutant Discharge Elimination System
AZSITE	Arizona Archaeological Site and Survey Database
BA	Biological Assessment
BE	Biological Evaluation
BLM	Bureau of Land Management
BMP	best management practice
BO	Biological Opinion
CAA	Clean Air Act
CAP	Central Arizona Project
CE/CATEX	Categorical Exclusion
CEC	categorical exclusion checklist
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGP	Construction General Permit
CLOMR	Conditional Letter of Map Revision
CLOMR-F	Conditional Letter of Map Revision based on Fill
CWA	Clean Water Act
DHS	U.S. Department of Homeland Security
DOI	Department of the Interior
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FOIA	Freedom of Information Act
FONSI	Finding of No Significant Impact
FWCA	Fish and Wildlife Coordination Act
JD	Jurisdictional Delineation
LEDPA	least environmentally damaging practicable alternative
MBTA	Migratory Bird Treaty Act
MS4	municipal separate storm sewer systems

NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOI	Notice of Intent
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NWP	Nationwide Permit
OAW	Outstanding Arizona Waters
OHWM	ordinary high-water mark
PCN	Preconstruction Notification
RCRA	Resource Conservation and Recovery Act
Reclamation	Bureau of Reclamation
RIBITS	Regulatory In-Lieu Fee and Bank Information Tracking System
SHPO	State Historic Preservation Office
SR	State Route
Stafford Act	Robert T. Stafford Disaster Relief and Emergency Assistance Act
SWPPP	stormwater pollution prevention plan
T&E	threatened and endangered
TPC	Tournament Players Club of Scottsdale
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USFWS	U.S. Fish and Wildlife Service

1. EXECUTIVE SUMMARY

This Environmental Memorandum summarizes the results of background research and preliminary agency coordination conducted in support of the Reata Wash Flood Control Improvement Study (Reata Wash Study), and provides a review of environmental regulations and anticipated agency involvement relevant to the Reata Wash Study.

The flood control improvements being evaluated in the Reata Wash Study may result in federal actions (e.g., permit approvals, funding, etc.) by the U.S. Bureau of Reclamation (Reclamation), Federal Emergency Management Agency (FEMA), and/or the U.S. Army Corps of Engineers (USACE). Therefore, compliance with federal environmental regulations such as the National Environmental Policy Act (NEPA), Clean Water Act (CWA), Endangered Species Act (ESA), and the National Historic Preservation Act (NHPA) is anticipated. For actions that involve multiple federal agencies, a common approach is for a single federal agency to act as a lead, or for the multiple agencies to act jointly or cooperatively with the lead federal agency. However, each agency that conducts a federal action will continue to require compliance with their agency-specific NEPA requirements. Each level of NEPA analysis for each agency varies in the magnitude of required documentation and evaluation, including agency scoping, public involvement, and technical resource studies (e.g., biological and cultural resource evaluations).

Based on previous and ongoing coordination between the City of Scottsdale (City) and the applicable federal agencies, as well as the site-specific environmental conditions and the flood control improvements as described in the Reata Wash Study, the following NEPA documentation is anticipated:

- Reclamation: a Reclamation Categorical Exclusion could be needed if flood control improvements occur within Reach 5. Preparation of a Reclamation Environmental Assessment (EA) or Environmental Impact Statement is not anticipated, but would be determined by Reclamation upon completion of the Categorical Exclusion Checklist (CEC).
- FEMA: if federal funds through FEMA are used for the design and/or construction of the flood control improvements, a FEMA EA would likely be required. If FEMA funding is not used, the FEMA NEPA process would not apply.
- USACE: A CWA Section 404 Individual Permit is anticipated to be needed for the proposed project due to the level of impacts to waters of the U.S. that would be caused by the installation of the proposed flood control improvements. USACE approval of an Individual Permit requires project compliance with USACE NEPA process. The USACE's CWA Section 404 Individual Permit application includes preparation of a *Department of the*

Army Environmental Assessment and Statement of Finding, which serves as the USACE's EA for compliance with the USACE NEPA process.

The City has met with Reclamation and the USACE to discuss potential environmental concerns within the Reata Wash Study Area and the agency-specific environmental documentation that should be anticipated for the potential flood control improvements. Based on these discussions, it should be anticipated that the USACE would be the lead federal agency for improvements within the overall Reata Wash Study Area. Reclamation, and potentially FEMA, would likely act as either a joint lead or cooperating agency, and the NEPA process would be documented according to the USACE's Environmental Assessment and Statement of Findings.

Since the proposed flood control improvements are anticipated to cause permanent and temporary impacts to waters of the U.S. under jurisdiction of the USACE, compliance with CWA Sections 401, 402, and 404 will be required. Based on the estimated level of impacts to waters of the U.S. from the proposed flood control improvements, a Section 404 Individual Permit and a Section 401 individual water quality certification are anticipated to be needed. Additionally, since more than 1 acre of land would likely be disturbed during construction activities, an Arizona Pollutant Discharge Elimination System (AZPDES) Construction General Permit (CGP) with an associated stormwater pollution prevention plan would be required.

Based on the presence of potential waters of the U.S. within the Reata Wash Study Area and the anticipated need for a Section 404 permit, the submittal of a Preliminary or Approved Jurisdictional Delineation to the USACE would be required to document the locations and extent of potentially jurisdictional waters of the U.S. The Section 404 Individual Permit that is anticipated to be needed would require demonstration that the proposed improvements minimized or avoided impacts whenever practicable. Any impacts that cannot be avoided may be subject to compensatory mitigation as determined by the USACE.

Preparation of a Biological Evaluation (BE) is anticipated to be needed to support the agency-specific environmental compliance documents for the construction of flood control improvements within the Reata Wash Study Area. The BE should evaluate potential impacts to special status species, including those protected under the ESA. Improvements within the immediate channel bottom of Reata Wash (including those related to drop structures, culverts, dissipaters, and inlet/outlet structures) should also allow for continued wildlife movement upstream and downstream of any structure to maintain north-south wildlife movement through the Reata Wash corridor.

Based on a review of previous cultural resource survey documentation, the majority of the Reata Wash Study Area has been surveyed for cultural resources, and sites

determined eligible for inclusion in the National Register of Historic Places are present. If the City council authorizes the Reata Wash Study move forward into design, it is recommended that the location of potential improvements be reviewed with respect to the results of the Class I research to determine the need for additional cultural resource survey and reporting. Depending on the location of potential improvements and associated ground disturbance, a new Class III survey may be needed in portions of the Reata Wash Study Area where previously conducted surveys do not meet current standards or where survey has not yet been completed.

2. INTRODUCTION

The City of Scottsdale (City) is conducting the Reata Wash Flood Control Improvement Study (Reata Wash Study) for the purpose of identifying and recommending flood control improvements within the Reata Wash floodplain that will reduce flood risks to residents, property and public infrastructure. A secondary goal of the Reata Wash Study is to remove or reduce the size of the existing Federal Emergency Management Agency (FEMA)-designated Reata Wash floodplain.

Should the Reata Wash Study be approved as a project, the construction of the proposed flood control improvements is expected to include the issuance of a federal permit, approval for activities located on federal lands, and/or use of federal funding. Therefore, the proposed flood control improvements are anticipated to require compliance with the National Environmental Policy Act (NEPA), Clean Water Act (CWA), Endangered Species Act (ESA), National Historic Preservation Act (NHPA), and other federal and state environmental laws and regulations. This Environmental Memorandum summarizes the results of background research and preliminary agency coordination conducted in support of the Reata Wash Study, and provides a review of environmental regulations and anticipated agency involvement relevant to the Reata Wash Study.

2.1 Purpose of the Environmental Memorandum

An evaluation was completed that reviewed a variety of flood control options within each of the five designated Reata Wash Study reaches identified in the Reata Wash Study's Design Concept Report, the *Proposed Condition Hydraulic Capacity Memorandum*, and the *Construction Cost and Quantities Memorandum* to determine potential environmental requirements that may be necessary during a design process. Regulatory agencies responsible for the oversight of resources located within the Reata Wash Study Area were consulted to identify information needs and submittal requirements related to their specific environmental clearance processes.

This Environmental Memorandum provides a summary of current environmental regulations and agency-specific environmental resource surveys, reports, clearances, permits and/or concurrences anticipated to be necessary based on a review of the Reata Wash Study Area conditions, preliminary agency coordination, and a review of proposed reach improvement alternatives. Recommendations for environmental compliance with resource responsible agencies and the durations of their anticipated reports and clearances are also provided.

2.2 Reata Wash Study Area Description

The Reata Wash Study Area is located in north Scottsdale from north of Pinnacle Peak Road to the Central Arizona Project (CAP) Canal (Figure 1). Reata Wash, located on the eastern boundary, is the major drainage conveyance in the Reata Wash Study Area. Land ownership within the Reata Wash Study Area includes private, City, Arizona State Land Department, Bureau of Reclamation (Reclamation), and Bureau of Land Management (BLM). Key transportation corridors present in the Reata Wash Study Area include State Route Loop 101, Pima Road, Bell Road, and Thompson Peak Parkway. Land use within and adjacent to the Reata Wash Study Area is primarily residential, but also includes commercial, recreational, institutional (e.g., churches and schools), and undeveloped open space. Major commercial facilities with significance to the City include WestWorld and the Tournament Players Club (TPC) of Scottsdale.

The Reata Wash floodplain consists of an alluvial fan with a series of washes that only carry flows during and following storm events (ephemeral washes). Stormwater flow from the McDowell Mountains and surrounding desert landscape is funneled towards the apex of the fan in the upper portion of the Reata Wash Study Area. South of the Pinnacle Peak Road Bridge, stormwater flow diverges into multiple ephemeral waterways, including Dobson Wash to the west and Reata Wash to the east. Stormwater and sediment travel down irregular terrain and spread out unpredictably across the fan, depositing sediment and creating a potential flooding threat to residents, facilities, and structures throughout the Reata Wash floodplain. Within the Reata Wash Study Area, it is estimated that approximately 4,600 residential, public facilities and commercial structures have a potential risk of flooding in accordance with current FEMA guidelines. The hydraulic analysis conducted as part of the Reata Wash Study estimated that during a 100-year storm event, 13,015 cubic feet per second of stormwater will flow through Reata Wash at the existing Pinnacle Peak Road Bridge.

For the purpose of evaluating flood control options, Reata Wash has been divided into five reaches within the Reata Wash Study Area (Figure 2), including:

- Reach 1: Pinnacle Peak Road to 1,000 Feet North
- Reach 2: Pinnacle Peak Road to Cross Canyon Way
- Reach 3: Cross Canyon Way to Thompson Peak Parkway
- Reach 4: Thompson Peak Parkway to Bell Road
- Reach 5: Bell Road to East McDowell Mountain Ranch Road

Within each reach, the Reata Wash Study evaluated the construction of various flood control measures based on technical feasibility, compatibility with existing drainage infrastructure, land ownership, and ability to contain stormwater flow. Channel configurations, corridor widths, and types of materials for use in the new conveyance corridor were then evaluated according to the physical and land ownership constraints

of each reach, in order to determine potential design alternatives. Additionally, the Reata Wash Study considered the unique desert environment of the Reata Wash Study Area, and options evaluated within each reach considered environmental resource issues and the application of potential context-sensitive solutions in order to be compatible with the surrounding environment and compliant with applicable environmental laws and regulations.

2.3 Previous Environmental Documentation

A comprehensive data collection effort, including a Freedom of Information Act (FOIA) request with the U.S. Army Corps of Engineers (USACE), was completed by the City with the intent of supporting the Reata Wash Study with previously completed environmental resource and engineering documentation. The data collection effort resulted in various documents completed in support of previously constructed City infrastructure improvements and privately sponsored residential and commercial developments within the Reata Wash Study Area, such as:

- NEPA documentation
- Technical resource evaluations (e.g., biological and cultural reports)
- Applications for CWA Section 404 permits
- Correspondence and decision-making records, including coordination with USACE, Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (USFWS), State Historic Preservation Office (SHPO), and other resource-responsible state and local agencies.

The data collection effort resulted in information associated with numerous planned and constructed projects located within the Reata Wash Study Area that have received USACE permit authorization. The City submitted a FOIA request to the USACE for file numbers associated with these projects and the information received which included Section 404 permit submittals, technical resource documentation, public feedback, and agency correspondence associated with the proposed improvements. The information received as part of the FOIA request will provide an additional data source for review and consideration in the event that planning and permitting efforts occur.

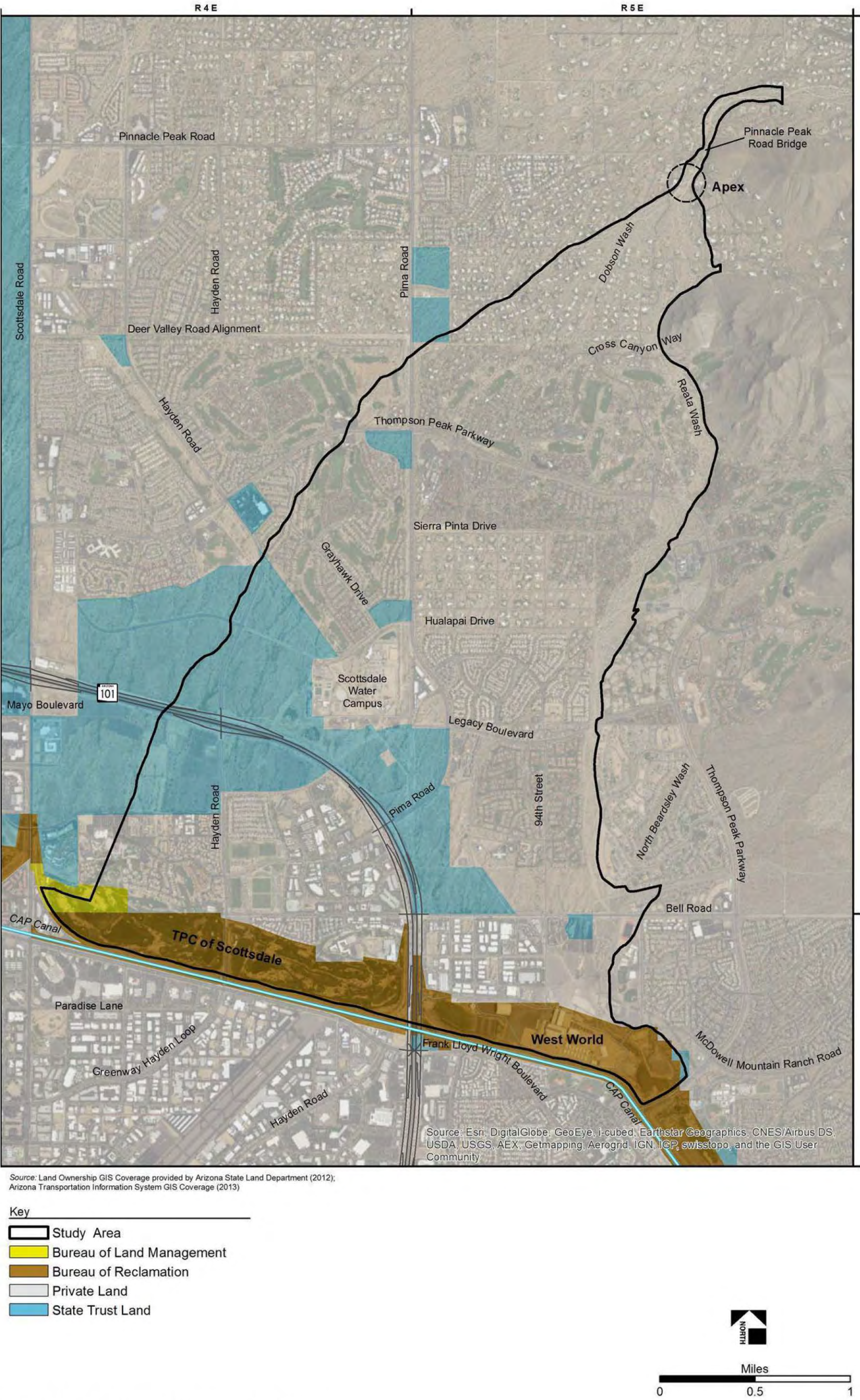
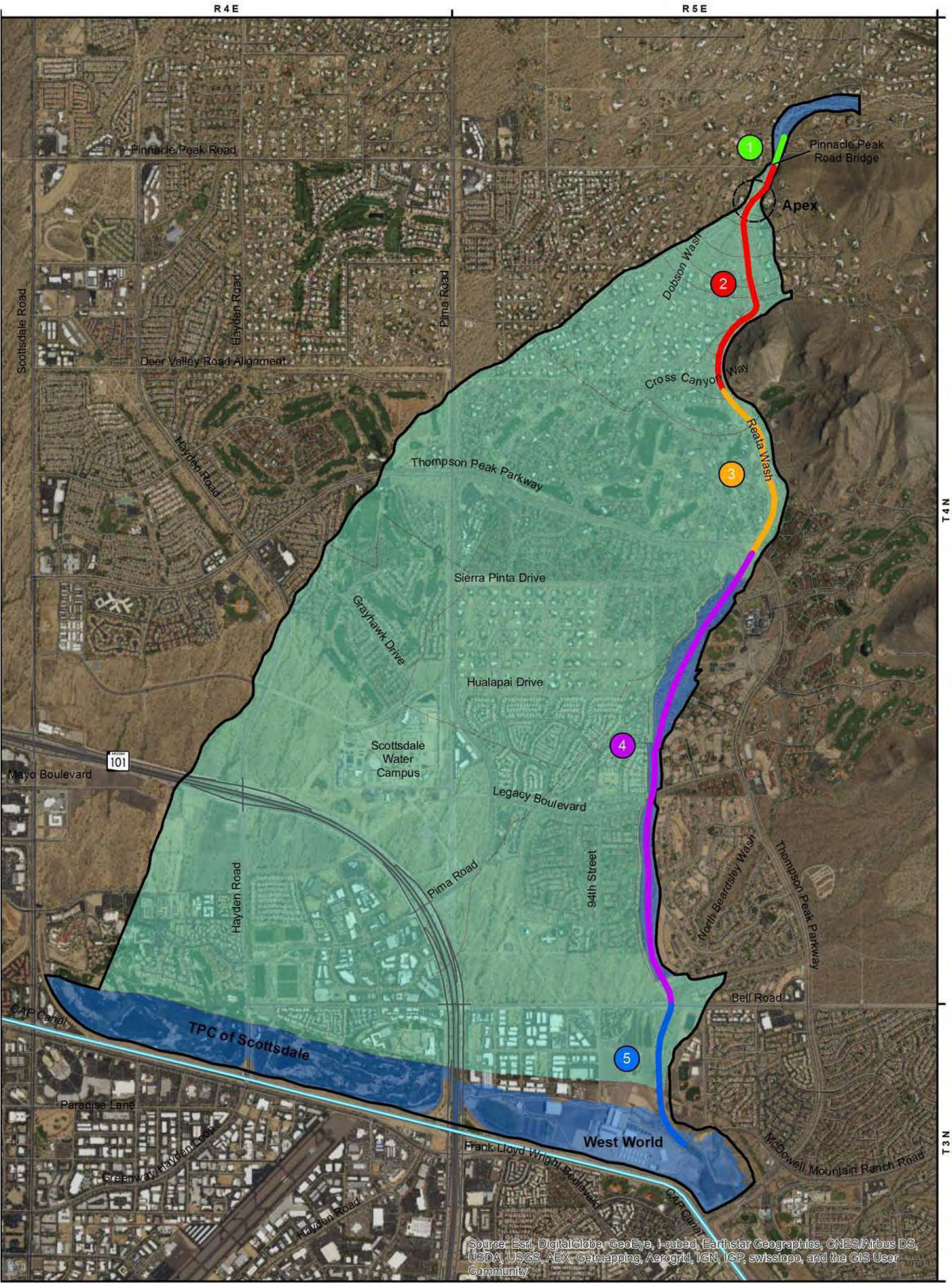


Figure 1. Reata Wash Study Area Vicinity Map



Source: Floodplain GIS Coverage provided by FEMA (2016);
Arizona Transportation Information System GIS Coverage (2013)

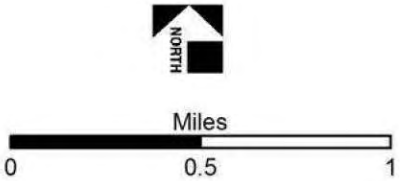
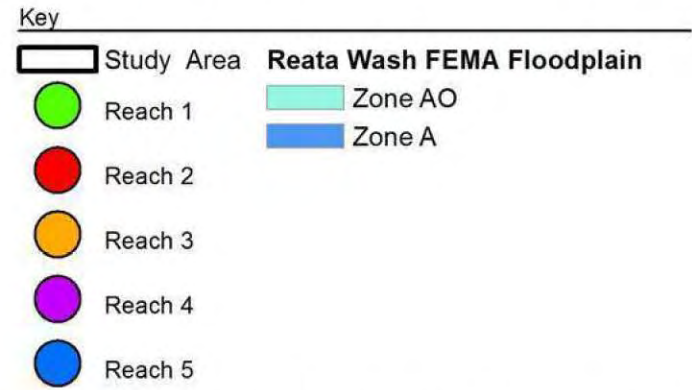


Figure 2. Reata Wash Flood Control Improvement Study Reaches

Based on land ownership, regulatory authority, and regulatory requirements that would be triggered during construction of new flood control improvements within the Reata Wash Study Area (e.g., permit approvals, funding, etc.), federal agencies that may have jurisdiction within the Reata Wash Study Area include: Reclamation, FEMA, the USACE, and BLM. Therefore, compliance with federal environmental regulations such as NEPA, CWA, ESA, and NHPA, may be required. The flood control improvements being evaluated in the Reata Wash Study may result in actions by Reclamation, FEMA, and/or the USACE. The following sections discuss current processes associated with these agencies and key regulations as they apply to the Reata Wash Study. The proposed improvements are not anticipated to require action from BLM; therefore, BLM regulatory requirements are not summarized in this memorandum.

3. NEPA OVERVIEW

The National Environmental Policy Act of 1969 (42 USC 4321 et seq.) establishes policy and goals for the protection, maintenance, and enhancement of the environment. NEPA requires federal agencies to consider the environmental impacts of their proposed discretionary actions during their decision-making processes and provides a mechanism for meeting many environmental reviews and approvals. Through the NEPA process, potential alternatives are identified and evaluated for their environmental effects.

Each federal agency has created and implements their own NEPA compliance procedures that fit their agency-specific mandates/missions, statutory requirements, decision-making authority, and the extent to which federal agencies use NEPA analyses to satisfy other review requirements. Consequently, NEPA procedures vary from agency to agency. Agency-specific NEPA processes relevant to the Reata Wash Study are summarized in Section 4. Agency-Specific NEPA Processes.

NEPA serves as a method for documenting compliance with other applicable environmental regulations, including but not limited to:

- Clean Water Act (CWA)
- Clean Air Act (CAA)
- Endangered Species Act (ESA)
- Executive Order 11988 Floodplain Management, as amended
- Executive Order 11990 Protection of Wetlands (42 FR 26961)
- Fish and Wildlife Coordination Act (FWCA)
- Migratory Bird Treaty Act
- Section 106 of the National Historic Preservation Act (NHPA)
- Resource Conservation and Recovery Act
- Title VI of the 1964 Civil Rights Act

Compliance with these environmental regulations, including CWA, ESA, and NHPA, may require technical resource surveys and/or documentation, depending on the proposed action and the applicable federal agencies' requirements. See Sections 5. Clean Water Act, 6. Biological Resources and 7. Cultural Resources for more information on technical resource studies.

3.1 When is NEPA Compliance Required?

NEPA compliance is required for all discretionary federal actions (40 CFR 1508.18), such as:

- New and continuing activities, including projects and programs entirely or partly financed (i.e., funded), assisted, conducted, regulated, or approved by federal agencies (i.e., permitted)
- New or revised agency rules, regulations, plans, policies, or procedures
- Legislative proposals

NEPA does not apply to non-federal (i.e., state, local, tribal, and private) entities, unless a discretionary federal action is needed prior to the construction of the proposed activity.

The level of NEPA analysis and documentation required will vary, and exemptions may apply, depending on the particular action and the federal agency(ies) with jurisdiction or approval authority. Each applicable agency should be consulted before the decision is made that an action is exempt from NEPA documentation requirements. Section 4. Agency-Specific NEPA Processes discusses the anticipated agencies that will require coordination and their applicability to the Reata Wash Study Area.

It should be noted that in emergency situations, regulations allow for agencies to immediately take actions if necessary without following the usual NEPA procedures. However, the responsible agency must still consider environmental consequences and mitigate potential adverse effects to the extent practicable. Emergency situations are rare and documentation requirements will vary depending on the emergency action, so the applicable federal agency should be consulted prior to commencement of the action.

3.2 Role of Federal Agencies

The role of each applicable federal agency in the NEPA process depends on the agency's function and relationship to the proposed undertaking. For activities that involve actions from more than one federal agency, a lead agency is designated to supervise compliance with NEPA requirements. Federal agencies may also act as joint lead agencies with other federal, state, tribal or local agencies. In addition, one or more of the other applicable federal, state, tribal, or local agencies may be a cooperating

agency in the NEPA process if they have special expertise with respect to an environmental issue or jurisdiction by law. The lead agency has ultimate responsibility for the content of any NEPA document prepared, and a cooperating agency assists the lead agency throughout the NEPA process. When multiple agencies are involved, a memorandum of understanding (MOU) among all parties may be developed to define the roles, funding sources, assignments, staff commitments, and schedule.

Often, joint lead and/or cooperating agencies will adopt NEPA documents prepared by another agency if it meets their agency-specific NEPA requirements in order to avoid duplication of efforts. If needed, the cooperating and/or joint lead agency may augment the document to meet any additional agency-specific NEPA requirements.

The City met with Reclamation and the USACE to discuss potential environmental concerns within the Reata Wash Study Area and the agency-specific environmental documentation that should be anticipated for the potential flood control improvements. Based on these discussions, it should be anticipated that the USACE would be the lead federal agency for improvements within the overall Reata Wash Study Area. Reclamation, and potentially FEMA, would likely act as either a joint lead or cooperating agency during the NEPA process. It is possible that compliance with multiple agencies' NEPA requirements can be accomplished with a single NEPA document managed by the lead federal agency. For the Reata Wash Study, it is anticipated that NEPA compliance would be documented according to the USACE's Environmental Assessment (EA) process (i.e., Environmental Assessment and Statement of Findings).

The completion of multiple agency-specific NEPA documents may still be required if requested by a joint lead agency depending on that agency's assessment of the nature of the action, the relevant environmental issues, and the potential magnitude of the action's environmental impacts. Separate NEPA documentation for FEMA may be needed if FEMA funding is utilized. See Section 4. Agency-Specific NEPA Processes for details about the USACE, Reclamation, and FEMA NEPA processes.

3.3 Levels of NEPA Analysis

The appropriate level of NEPA analysis and documentation for a proposed action is determined by the lead or federal land-managing agency based on the nature of the action, the relevant environmental issues, and the potential magnitude of the action's environmental impacts. There are three major levels of NEPA documentation:

- **Categorical exclusion (CE; also known as a CATEX):** For types of actions that have generally been determined to have no significant effect on the human environment, unresolved conflicts with alternative uses of available resources, or extraordinary circumstances. A CE is the simplest level of NEPA documentation and environmental review, and does not require the

assessment of alternatives to the proposed action. Each federal agency has their own list of actions that may qualify for CE-level documentation, and coordination with each applicable agency should be conducted to confirm that a given action meets all associated agency-specific requirements.

- **Environmental assessment (EA):** If it is unknown whether the action would cause significant impacts, an EA would be prepared to determine the anticipated level of impacts. EAs require a greater level of analysis than a CE, but have a lower level of analysis and public involvement than an Environmental Impact Statement (EIS). An EA evaluates a proposed action and its alternatives, including a No Action alternative, for potentially significant environmental effects, including direct, indirect, and cumulative impacts. The EA will conclude with either a Finding of No Significant Impact (FONSI) or a determination that significant environmental effects are present (requiring the preparation of an EIS). Each agency has their own process for EAs and associated public involvement so the lead agency-specific guidelines should be followed.
- **Environmental impact statement (EIS):** If the action would cause significant environmental impacts to the quality of the human environment as determined by the lead federal agency, an EIS must be prepared and these potential impacts must be disclosed to the public. An EIS provides a more intensive discussion of potentially significant environmental effects of the proposed action and the reasonable alternatives that may avoid or minimize adverse impacts or enhance the quality of the human environment. The EIS process also requires a thorough agency scoping and public involvement process (40 CFR 1501.7). The determination that an EIS is needed may result from preparation of an EA or it may be apparent based on the nature of the action and its associated known environmental effects (see also 40 CFR 1502.4 and 40 CFR 1508.27).

For the lead or federal land managing agency to determine the appropriate level of NEPA analysis and documentation, the action must be clearly defined and take into account all directly related federal and nonfederal actions, including all connected actions. NEPA requires that all individual related components be evaluated in the same document to ensure that all connected actions have been appropriately considered. Dividing a large action into a series of smaller actions is not allowed, and the proposed action must be considered in context with other related actions taking place. Per 40 CFR 1508.25, actions are connected if they:

- 1) Automatically trigger other actions that may require environmental impact statements,
- 2) Cannot or will not proceed unless other actions are taken previously or simultaneously, or

- 3) Are interdependent parts of a larger action and depend on the larger action for their justification.

The improvements proposed under the Reata Wash Study would be a connected action if they do not have independent utility. For example, flood control options proposed within individual reaches may not have independent utility and could be considered a connected action. If the City council authorizes the Reata Wash Study move forward into design, improvements proposed under the Reata Wash Study should be reviewed to determine if there is a connected action.

3.4 Agency Scoping and Public Involvement

Potentially significant issues should be identified through the scoping process (40 CFR 1501.7). Scoping should be conducted as early as possible so that potential issues and concerns can be identified and taken into account during the NEPA process and during design. In order to properly identify all potentially significant issues, a variety of sources should be consulted (e.g., affected federal, state, and local agencies; affected tribes; proponent of the action; and other interested persons) as appropriate to the particular action. This may or may not include public involvement depending on the action, appropriate level of NEPA analysis, and agency-specific processes.

Requirements for public involvement in the NEPA process are outlined in 40 CFR 1506.6. Public involvement should include effective communication with all affected and interested individuals and/or groups, and all the various stakeholders. Methods may include direct mailings, public meetings, newspaper articles, project websites or internet postings, and/or other media broadcasts. Public notification and involvement during the NEPA process is required for EISs. Depending on the federal agency, public scoping may also be required for EAs and CEs. The lead federal agency should be consulted to determine if public involvement is appropriate for a given proposed action.

3.5 Technical Resource Studies

Technical resource studies are conducted to evaluate potential impacts from the proposed action to various resources and are commonly used as the basis of decisions rendered in the NEPA environmental document. The applicable technical resource studies will vary depending on the specific details of the proposed action, but may include surveys and/or reports for: biological and natural resources, historic and cultural resources, water resources, visual resources, recreational resources, etc. Coordination with other oversight agencies may also be needed in support of the technical resource studies (e.g., USFWS for potential impacts to ESA-listed species).

3.6 Environmental Commitments and Mitigation

When a proposed action has potential adverse environmental impacts, environmental commitments to monitor and/or mitigate for those impacts may be required. The purpose of environmental commitments is to reduce or avoid impacts and/or restore or enhance environmental quality. These commitments may also include conditions listed in applicable grants, permits, or other approvals for the proposed action. All environmental commitments are required to be funded as part of the proposed action. Construction of the environmental commitments may be delegated to a third-party contractor or required as a condition for a permittee, lessee, or loan recipient for individual actions, but compliance with the commitments remains the responsibility of the lead federal agency. This applies to actions at all levels of NEPA analysis, including CEs, EAs, and EISs. Future environmental commitments and mitigation measures which may be applicable for the construction of flood control improvements will be assigned by each respective resource management agency during a NEPA review process.

3.7 Record Keeping

Complete and accurate files must be kept and maintained throughout the NEPA process in an administrative record. The contents of the administrative record will vary depending on the specific proposed action, but should include all materials that were considered by the lead federal agency in reaching its decision under NEPA. For example: planning documents, notices, documentation of scoping meetings, public comments and agency responses, supporting technical resource documents and studies, correspondence (letters, memoranda, emails), draft and final versions of CE/EA/EIS documents, FONSI, Record of Decision, implementation/monitoring programs, environmental commitment plans, etc. as applicable.

A complete and well-organized administrative record facilitates FOIA requests on agency actions, is an information resource for preparation of future NEPA documents, and is a source for elements to be tiered to or incorporated by reference.

4. AGENCY-SPECIFIC NEPA PROCESSES

Reclamation, FEMA, and the USACE each have their own NEPA processes and procedures. Preliminary coordination with Reclamation, FEMA, and the USACE has been conducted to discuss each agency's anticipated NEPA requirements for the proposed action. As mentioned, it is currently anticipated that the USACE would act as the lead federal agency. Reclamation, and potentially FEMA, would be joint lead or cooperating agencies. However, it is recommended that the City continue coordination with each agency, as needed, if the City council authorizes the Reata Wash Study move forward into design. Reata Wash Study obligations and environmental compliance

recommendations for each management agency are provided below and are included in Appendix A. Table 1. Summary of Potential Reata Wash Study Obligations and Recommendations. The following environmental resources were not evaluated: prime or unique farmland, hazardous materials, noise, air quality, social and economic impacts, land use, or visual resources.

4.1 Bureau of Reclamation

Reach 5 of the Reata Wash Study Area includes the Reach 11 Recreational Area, a Reclamation facility. Reclamation has an obligation to assure that public use of these areas is maintained in accordance with its land use policies, agreements, and investments. Any activities on these lands and their associated impacts to recreational uses and other existing resources must be coordinated with and approved by Reclamation. Therefore, the construction of flood control improvements within Reach 5 is anticipated to require compliance with Reclamation's NEPA process.

Reclamation falls under the purview of the Department of the Interior (DOI) and therefore follows DOI's NEPA regulations (43 CFR Part 46). The Reclamation NEPA process should be initiated if the proposed action is subject to Reclamation control and responsibility (e.g., the construction and/or disturbance on lands managed by Reclamation) and would cause effects on the human environment. If needed, Reclamation will determine the appropriate level of NEPA documentation (CE, EA, or EIS) required for the proposed Reclamation action and will work with applicants in preparing the necessary documentation and implementing a public involvement program, if appropriate.

The *Reclamation's NEPA Handbook* (Reclamation 2012) provides a thorough explanation of their NEPA processes and requirements. To initiate coordination with Reclamation, basic information such as the project name, purpose, location, nature of activity, any available maps and reports that have been completed, etc. will need to be provided to the regional Reclamation office.

4.1.1 Reclamation CEs

A Reclamation CE would be appropriate for actions that correspond to a specific exclusion category as established by DOI or Reclamation, and do not have any extraordinary circumstances. DOI's list of CEs is provided in 43 CFR 46.210, and the Reclamation-specific CEs are provided in DOI's Departmental Manual, Part 516, Section 14.5. Extraordinary circumstances specific to DOI are listed in 43 CFR 46.215; the list includes but is not limited to significant impacts on biological, cultural, and water resources.

Under Reclamation's NEPA process, the completion of a Categorical Exclusion Checklist (CEC) is recommended for actions that may qualify under an exclusion category to evaluate the action relative to the impacts it may cause. The evaluation criteria and exceptions of a CEC ensures that sufficient review of the action is undertaken to verify that the action qualifies for the CE and no extraordinary circumstances are present. Refer to Chapter 5 of Reclamation's NEPA Handbook for additional information the CE process, listing of evaluation criteria and exceptions, and example CEC checklist.

4.1.2 Reclamation EAs

Preparation of an EA will be required for all Reclamation actions except for:

- Actions exempted from NEPA
- Actions covered by a DOI CE
- Actions that qualify for a Reclamation CE based upon the CEC
- Actions which have been sufficiently addressed by an earlier environmental document (generally an EA or EIS)
- Actions for which it is obvious that an EIS will be needed (Reclamation 2012)

An EA may also be used for proposed actions in which small changes have been made and an EIS has already been prepared (i.e., "tiering"; refer to 43 CFR 46.140[c] and 40 CFR 1508.28). In these cases, the EA must include a finding that the conditions and environmental effects in the previously completed EIS are still valid or address any exceptions.

The required content of a Reclamation EA includes a description of the proposed action and need for the proposal; alternatives to the proposed action; the affected environment; environmental consequences of the proposed action and alternatives; a list of agencies and persons consulted; and environmental commitments, as needed (refer to Section 6.4 of Reclamation's NEPA Handbook (Reclamation 2012). The timeframe for completion of a Reclamation EA is highly variable (e.g., a few weeks to several months or more) and depends on the complexity of the action, extent of potential environmental effects, and level of public involvement and controversy. A Reclamation EA for a simple action may be a short document prepared by Reclamation and approved with a public Notice of Availability without a formal public review process; however, consultation with relevant agencies and affected parties should be conducted. A Reclamation EA for a complex action may require substantial agency and public involvement.

Scoping for Reclamation EAs typically involves intra-agency contacts (i.e., relevant groups or staff within Reclamation) and interagency contacts (e.g., USFWS, the USACE, and SHPO, as applicable) to define the potentially significant issues and the scope of analysis. Reclamation does not necessarily require public scoping for an EA, but may

determine based on the action that it would be beneficial to conduct a public review and/or public meetings as well. Public notice of the availability of the EA is required (40 CFR 1506.6[b]). However, public involvement for an EA may only consist of the public notice of availability with no formal 30-day public review.

The EA and the FONSI, as applicable, must be distributed to appropriate agency and public entities that were involved in the preparation of or had commented on the EA. For proposed actions that are without precedent or would typically require an EIS, the FONSI must be published for a 30-day public review as required by the Council on Environmental Quality. Otherwise, the NEPA process is complete with the issuance of the FONSI. Refer to Chapter 6 of Reclamation's NEPA Handbook for additional information on the EA process, including an example EA.

4.1.3 Reclamation EISs

An EIS will need to be prepared if Reclamation determines that a proposed action has the potential for significant environmental impacts, either during the EA process or because it is an action that typically requires an EIS. Reclamation actions normally requiring the preparation of an EIS are listed in 516 DM 14. Preparation of a Reclamation EIS is not anticipated for the Reata Wash flood control improvements, and is therefore not detailed here. Refer to Chapter 7 of Reclamation's NEPA Handbook for additional information on their EIS process.

4.1.4 Agency Scoping and Public Involvement

For proposed actions where a CE or EA is anticipated to be the appropriate level of analysis, Reclamation typically scopes intra-agency contacts (i.e., relevant groups or staff within Reclamation) and interagency contacts (e.g., USFWS, the USACE, and SHPO) as applicable to define the potentially significant issues and the scope of analysis. Reclamation does not necessarily require public scoping for a CE or EA, but may determine based on the action that it would be beneficial to conduct a public review and/or public meetings as well. Public notice of the availability of the EA is required (40 CFR 1506.6[b]). However, public involvement for an EA may only consist of the public notice of availability with no formal 30-day public review.

For Reclamation CEs, relevant environmental resources and potential impacts from the proposed action must be evaluated during preparation of the CEC, but formal reports or documentation may not be needed. As a general rule, preparation of a CEC should involve research, a few coordination telephone calls, and/or short face-to-face discussions to get information, as needed, to fill out the checklist. Some internal and external scoping of issues and documentation may also be required.

Reclamation EAs and EISs should integrate any technical resource surveys and studies required by other applicable environmental laws and executive orders (e.g., CWA, NHPA, FWCA, ESA, etc.). The CEC template should be used to provide a preliminary scope of the environmental issues that will need to be addressed during the NEPA clearance process, but other resources may also need to be examined depending on the nature of the proposed action. It should be noted that an EA can be used as Reclamation's biological assessment for compliance with the ESA, so a separate biological report may not be necessary.

4.1.5 Reata Wash Study Obligations and Recommendations

The Reclamation Lower Colorado Region Phoenix Area Office oversees actions within the Reata Wash Study Area. According to Reclamation's *Guidelines for Road Crossings and Development within Dike Drainage Basins Hayden/Rhodes Aqueduct–Reach 11*, Reclamation and the cities of Scottsdale and Phoenix have entered into land use and management agreements for public recreational use and development of Recreational Area lands located north of the CAP canal between Cave Creek Road and 108th Street. Various public recreational facilities and uses have already been developed on these lands, including TPC and WestWorld, both of which are City-managed facilities that hold leases with Reclamation.

The City met with the Reclamation environmental, engineering and operational staff on February 23, 2016 and again on April 4, 2016 to discuss the Reata Wash Study. The City provided an overview of the Reata Wash Study, discussed its goals, and received feedback regarding future NEPA and engineering requirements for consideration if improvements include encroachment into the Reach 11 Recreational Area.

Based on this coordination, it is currently anticipated that a CE would be the appropriate level of Reclamation NEPA analysis for flood control improvements within Reach 5. Reclamation's CEC process would need to be completed to assess resource impacts for improvements such as channelization, new sediment basins, and/or installation of drop structures within Reach 5. It is not anticipated that Reclamation would be the lead federal agency for the overall improvements. Reclamation's jurisdiction is only applicable within Reach 5, however, it is recommended that the City keep Reclamation informed on the status of other Reata Wash Study related improvements and provide completed environmental and engineer information. This will allow Reclamation to respond to public inquiries and confirm compliance with related Reclamation requirements.

4.2 Federal Emergency Management Agency

FEMA is an agency of the U.S. Department of Homeland Security (DHS) and was created with the enactment of the Robert T. Stafford Disaster Relief and Emergency Assistance

Act (Stafford Act). As mentioned, FEMA has designated a 100-year floodplain within the Reata Wash Study Area. The construction of the flood control improvements that are being evaluated in the Reata Wash Study may qualify for FEMA funding due to the purpose and nature of the activity. If FEMA funding is obtained by the City to implement options or recommendations of the Reata Wash Study, the FEMA NEPA process would need to be initiated.

If the FEMA process is initiated, FEMA will review the proposed action to determine the appropriate level of NEPA documentation and public involvement needed. FEMA NEPA regulations (44 CFR Part 10) include the following levels of review under NEPA: Statutory Exclusions, CEs, EAs, and EISs. FEMA's *NEPA Desk Reference* (FEMA 1996) is an informal guidance document that includes FEMA's policies, requirements, guidance, and sample documents related to NEPA and other applicable environmental laws and executive orders. Additionally, the DHS' March 26, 2015 *Instruction Manual 023-01-001-01, Rev 01 "Implementing the National Environmental Policy Act"* (DHS 2015) provides current information related to DHS NEPA requirements for actions under the authority of FEMA.

4.2.1 Federal Emergency Management Agency Statutory Exclusions

Certain FEMA programs or activities, such as emergency actions or actions that have no or little potential to affect the environment, are exempted from NEPA compliance per Section 316 of the Stafford Act as amended (42 USC 5159). No NEPA documentation or memorandum to the file is required under the regulations for actions that qualify as a statutory exclusion (FEMA 1996).

4.2.2 Federal Emergency Management Agency CEs

Per 40 CFR 1508.4, FEMA CEs apply to actions that have been identified by FEMA to not individually or cumulatively have a significant effect on the environment (i.e., small, routine undertakings).

Many FEMA actions fit under one of their CE categories. FEMA's *Instruction Manual 023-01-001-01, Rev 01 "Implementing the National Environmental Policy Act"* includes the full list of categories that qualify for NEPA clearance under a CE (refer to category N, pages A-23 through A-27). If the proposed action fits under one of FEMA's CE categories (also referred to as CATEX categories), the next step is to determine if there are any Extraordinary Circumstances present. Additionally, a proposed action must not be a part of a larger action or a connected action and no extraordinary circumstances exist.

4.2.3 Federal Emergency Management Agency EAs

FEMA actions will require the preparation of an EA if the action does not fit under a statutory exclusion or CE category, or involves an extraordinary circumstance, and does

not involve known significant impacts to the environment. An EA is FEMA's mechanism to evaluate the likelihood of significant impacts or controversy involved in a FEMA funded or proposed action. For FEMA's review, it is required that an EA include the purpose and need, a description of all components of the proposed action and alternatives (including a no-action alternative), affected environment, environmental consequences, and mitigation of impacts. Agency and public scoping should be initiated during or immediately following project formulation to identify potential issues, concerns, and permitting needs. Applicants should be directly involved during scoping activities. Depending on the action, the methods and extent of scoping and public involvement will vary. At a minimum, public release of the draft EA is recommended and advertising the availability of a draft EA is standard practice. It should also be noted that Executive Orders 11988 and 11990 require public notice for an action that is proposed in a floodplain or wetland.

Following a thorough scoping process, a description of the affected environment should be developed that includes the full extent of the resources of concern. It is essential that resource data be current and supplemented by field reviews, data from reliable sources, and relevant information from resource responsible agencies. At a minimum, FEMA requires the following resources to be evaluated for impacts in an EA review:

- Wetlands
- Threatened and Endangered Species
- Historical and Cultural Resources

Impacts to additional resource categories may also require consideration depending on the nature and location of the proposed action and the results of public and agency scoping efforts. Based on a proposed action's environmental consequences, mitigation measures may be necessary to protect environmental resources and reduce impacts below the level of significance. If no significant impacts or controversy exist following the analysis or application of mitigation measures, then a FONSI will be issued for the proposed action. Otherwise, the FEMA EIS process must be followed.

4.2.4 Federal Emergency Management Agency EISs

If a proposed action has been determined to cause significant impacts or to be controversial, then an EIS will be required. For some actions it is not necessary to prepare an EA to determine the significance of impacts if it is readily apparent that the action will cause significant environmental impacts. FEMA has identified criteria for actions that normally require an EIS, with or without the preparation of an EA; these actions are listed in 44 CFR 10.8(b)(2).

Preparation of a FEMA EIS is not anticipated for the Reata Wash flood control improvements, and is therefore not detailed here. For additional information related to

FEMA's EIS process and requirements, refer to Chapter 4 of the NEPA Desk Reference (FEMA 1996) and Section D of the *Instruction Manual 023-01-001-01, Rev 01 "Implementing the National Environmental Policy Act"* (DHS 2015).

4.2.5 Reata Wash Study Obligations and Recommendations

FEMA's Region IX Office would be the contact for future FEMA NEPA actions within the Reata Wash Study Area, if needed. The Reata Wash Study has not been approved to advance to a project and funding has not been authorized at the time of this memorandum. If FEMA funding is not used for the flood control improvements, the FEMA NEPA process would not apply.

Should the Reata Wash Study be authorized to proceed, FEMA's approval and issuance of a Conditional Letter of Map Revision (CLOMR)/Conditional Letter of Map Revision will be required. The CLOMR process will require the submittal of ESA documentation. See Section 6, Biological Resources below for more information.

4.3 U.S. Army Corps of Engineers

The USACE administers Section 404 of the CWA, including jurisdictional determinations and authorization of Section 404 permits. The construction of the flood control improvements that are being evaluated in the Reata Wash Study will require a Section 404 permit due to the required work with Reata Wash, which is a potential waters of the U.S. under jurisdiction of the USACE. Activities that require a Section 404 permit must comply with NEPA. NEPA requirements as they apply to Section 404 permit approvals are discussed below.

Depending on the action and proposed impacts to waters of the U.S., the action may fit under a USACE CE category or the USACE may require preparation of an EA or an EIS. The USACE's Engineer Regulation 200-2-2: Procedures for Implementing NEPA (ER 200-2-2; USACE 1988) provides guidance for implementation of the procedural provisions of NEPA for the Civil Works Program of the USACE.

4.3.1 U.S. Army Corps of Engineers CEs

USACE CEs apply to actions that have been identified by the USACE to not individually or cumulatively have a significant effect on the environment or have any extraordinary circumstances. Although the action may be exempted from NEPA compliance, it is not exempted from other applicable environmental laws and Executive Orders (e.g., ESA, CWA, NHPA, CAA, etc.). USACE CE categories include a series of non-ground disturbing administrative actions and actions with only minor disturbances to the environment; a full list is included in ER 200-2-2.

4.3.2 U.S. Army Corps of Engineers EAs

As listed in ER 200-2-2, actions that normally require an EA include USACE regulatory actions, such as issuing a Section 404 permit. For actions that require a Section 404 permit due to impacts to waters of the U.S., the USACE' Section 404 permitting process satisfies NEPA compliance requirements. USACE guidance should be followed to determine if the proposed improvements meet the requirements for a Nationwide Permit (NWP) with or without USACE notification, or if an Individual Permit will be needed. Documentation requirements for a proposed action will differ depending on whether a NWP or an Individual Permit applies.

For actions with impacts to waters of the U.S. that do not meet the conditions of any NWP, an Individual Permit would be needed. The USACE' Individual Permit application is titled *Department of the Army Environmental Assessment and Statement of Finding* and serves as the USACE EA. The Individual Permit application must include a statement of the purpose and need for requiring a USACE permit, a description of the proposed action and alternatives, an evaluation to determine the action's compliance with applicable environmental laws, assessment of direct, indirect, and cumulative impacts, and a requirement for public review. The discussion of alternatives must comply with the USACE's *Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredge and Fill Material* (40 CFR 230). An Individual Permit will be reviewed by the USACE for NEPA adequacy and must result in a FONSI determination prior to authorization. The Individual Permit process is dependent on completion of the associated technical resource assessments (e.g., biological and cultural resource documentation).

Refer to Section 5.3 below for more information about the Section 404 permitting process, including NWPs and Individual Permits.

4.3.3 U.S. Army Corps of Engineers EISs

A USACE EIS would be required for certain actions that require an Individual Permit if they would or could result in significant impacts to the human environment. In many cases the decision that an EIS is needed is made by the USACE after their review of the completed Individual Permit application, which also serves as an EA. Some actions have been identified by the USACE to typically require an EIS, including:

- Feasibility reports for authorization and construction of major projects;
- Proposed changes in projects which increase size substantially or add additional purposes; and
- Proposed major changes in the operation and/or maintenance of completed projects.

District's may consider the use of an EA on these types of actions if early studies and coordination show that a particular action is not likely to have a significant impact on the quality of the human environment.

4.3.4 Reata Wash Study Obligations and Recommendations

Based on the Reata Wash Study Area, coordination with the USACE, and anticipated level of impacts to waters of the U.S., a CWA Section 404 Individual Permit and associated EA will likely be needed. The USACE' Arizona Branch (Phoenix office) of the Los Angeles District Regulatory Division is responsible for all Section 404 reviews and approvals that may be needed within the Reata Wash Study Area. Preliminary coordination with the USACE, Reclamation, and FEMA has indicated that the USACE is anticipated to be the lead federal agency for the flood control improvements being evaluated under the Reata Wash Study. Refer to Section 5. Clean Water Act for information related to the CWA documentation and submittal requirements anticipated to be necessary for the construction of flood control improvements in the Reata Wash Study Area.

5. CLEAN WATER ACT

The CWA is the primary federal statute governing discharge of pollutants into jurisdictional waters of the U.S., including perennial, intermittent, and ephemeral watercourses, their tributaries, and adjacent wetlands and special aquatic sites. The goal of the CWA is to establish water quality standards to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing point and nonpoint pollution sources. The EPA and the USACE share administration of the CWA Section 404 permitting program and the Arizona Department of Environmental Quality (ADEQ) has been delegated authority over Section 401 and 402 of the CWA for all non-tribal lands in Arizona. The flood control improvements being evaluated in the Reata Wash Study will need to comply with CWA Sections 401, 402, and 404. Therefore, summaries of these regulations are provided below.

5.1 Section 401

Actions that require a Section 404 permit must also comply with Section 401. The Section 401 water quality certification verifies that the prospective permit complies with the ADEQ's applicable effluent limitations and water quality standards. Section 404 permits cannot be issued until the Section 401 certification is obtained. There are two types of Section 401 water quality certification: conditional and individual. Many actions that require a Section 404 NWP are conditionally certified if they comply with the Section 401 General Conditions and there are no ADEQ designated impaired waters or their tributaries, Outstanding Arizona Waters, or lakes present in the vicinity. Actions must

be individually certified by ADEQ if they require a Section 404 Individual Permit, are located one-mile upstream or one-half-mile downstream of an ADEQ designated impaired water or Outstanding Arizona Waters (OAW), occur on a tributary to an impaired waters or OAW within one-mile from its mouth, or would impact lakes or reservoirs. The Section 401 General Conditions and NWP-specific conditions are outlined in the March 16, 2012 ADEQ letter titled *Clean Water Act 401 Certification for Nationwide Permits–March 18, 2012* (ADEQ 2012), which is included as an attachment to the USACE's 2012 Special Public Notice Nationwide Permits for Arizona (USACE 2012b).

An application for certification under CWA Section 401 is required for actions requiring individual certification, but not for actions that comply with conditional Section 401 certification.

5.2 Section 402

The National Pollutant Discharge Elimination System (NPDES) Program is authorized under Section 402 of the CWA. NPDES provides the statutory basis and structure for regulating the discharge of pollutants from any point or nonpoint sources into waters of the U.S., including sediment and construction debris-related pollutants generated during ground-disturbing activities that can be transported by storm water runoff. In 2002, the EPA delegated ADEQ the authority to implement a state level program, the Arizona Pollutant Discharge Elimination System (AZPDES) Program, for nontribal lands.

The AZPDES program offers two different types of permits: general and individual. General AZPDES permits allow for coverage under one permit for similar activities within a specific category, industry, or area. For example, the AZPDES Construction General Permit (CGP) (Permit No. AZG2013-001) covers all construction sites that disturb 1 acre or more, and the AZPDES Phase II municipal separate storm sewer systems (MS4) stormwater permit covers small). If an action meets the requirements for an available general permit, it must comply with the conditions of that permit in order to be covered under that permit. For example, as a condition of the AZPDES CGP, the proposed action must be designed to protect waters of the U.S. through the implementation of erosion control best management practices (BMPs), a Stormwater Pollution Prevention Plan (SWPPP) must be prepared, a Notice of Intent (NOI) must be filed before beginning ground disturbance activities, and a Notice of Intent (NOT) should be filed at the completion of construction activities. If the action does not fall within the coverage of a general permit, an individual AZPDES permit with specialized conditions will be required. More information regarding ADEQ's AZPDES program can be found on their website (ADEQ 2016b).

5.3 Section 404

Section 404 of the CWA regulates the discharge of dredged material and the placement of fill material within waters of the U.S. and authorizes the USACE to issue permits for such actions. Any activity that discharges dredged or fill material into waters of the U.S. would require a Jurisdictional Delineation (JD) to identify the limits of potential waters of the U.S. and a Section 404 permit from the USACE. Common types of activities that may require a Section 404 permit include, but are not limited to, geotechnical activities, channelization, construction or extension of bridges or culvert crossings, and the installation of drainage structures and bank protection features.

5.3.1 Jurisdictional Determinations

The first step in the Section 404 process is to determine the presence or absence of waters of the U.S. that may be impacted by the proposed action. Waters of the U.S. are formally defined by the CWA as "rivers, creeks, streams, and lakes extending to their headwaters and any associated wetlands." Wetlands are defined by the CWA as "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions." It should be noted that the EPA and USACE are currently working to update implementation of the CWA and clarify the term "waters of the United States." The Clean Water Rule, originally implemented on August 28, 2015, was the latest update to the CWA. However, it is currently under a nationwide court-ordered stay issued by the U.S. Court of Appeals for the Sixth Circuit as of October 9, 2015. Until the stay is lifted, the EPA and USACE are operating under the definition of "waters of the United States" prior to the Clean Water Rule (EPA 2016).

If potential waters of the U.S. are present, a field survey should be completed to identify the jurisdictional limits of those waters of the U.S. and either a Preliminary JD or an Approved JD would need to be prepared and submitted to the USACE for their review. Both the Preliminary JD and the Approved JD evaluate the potential for the existence of waters of the U.S. by assessing the presence or absence of an ordinary high-water mark (OHWM) and other specific physical characteristics associated with waters of the U.S. according to current USACE guidance. An OHWM is defined by 33 CFR Part 328.3 as a "line on the shore established by fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in character of the soil, destruction of terrestrial vegetation, or the presence of litter and debris".

A Preliminary JD must claim all waterbodies that have one or more OHWM indicators as under the USACE's jurisdiction, without consideration of a significant hydrological nexus. An Approved JD considers both the presence of OHWM indicators and the presence of

a significant hydrological nexus of each waterbody to a downstream traditional navigable waters of the U.S. An Approved JD typically requires a hydrological analysis to establish whether there is a significant nexus. Following the USACE's acceptance of the Preliminary JD or Approved JD, the limits of waters of the U.S. as defined in the JD should be overlaid on the disturbance footprint of the proposed action to determine if any dredged or fill material will be discharged into waters of the U.S. and whether a NWP or Individual Permit would be necessary. It should be noted that the submittal of a JD is required by the USACE if the action requires notification under a NWP or preparation of an Individual Permit. If notification is not required, the JD does not need to be submitted to the USACE for review and acceptance.

5.3.2 Nationwide Permits

Certain activities involving the discharge of dredged or fill material into waters of the U.S. are authorized by the USACE under the Section 404 NWP program in Arizona. For activities to be authorized under any NWP, the action and all associated activities must comply with the applicable NWP General and Regional Conditions. Refer to the Special Public Notice Nationwide Permits for Arizona (USACE 2012b) for detailed information about each of the available NWPs in Arizona and their associated General and Regional Conditions.

The proposed action must be clearly defined and all associated activities must be taken into consideration when determining the applicable NWP. The term "single and complete project" is defined as "the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers." (33 CFR 330.2[i]). For linear projects, the "single and complete project" applies to each crossing of a given waters of the U.S. For non-linear projects, the impacts to all waters of the U.S. are considered collectively as a "single and complete project" unless one or more activities or phases have "independent utility." Portions of a multi-phased project that depend upon completion of other phases of the project do not have independent utility and must be permitted together. As a rule, single and complete non-linear projects may not be "piecemealed" to avoid exceeding the limits of an appropriate NWP.

Actions that meet the conditions of a NWP and do not exceed the notification thresholds for that given NWP are authorized to proceed without notification to the USACE. If the action exceeds one or more of the notification conditions for the applicable NWP, notification to the USACE in the form of a Preconstruction Notification (PCN) is necessary. When needed, the PCN must be submitted to the USACE for review and authorization must be obtained before construction can commence. A PCN application package must include, at a minimum:

- Completed Form ENG 4345 application
- Statement of Compliance with NWP General Conditions

- Project design plans
- Profile and cross-section exhibits of impacted waters of the U.S.
- Recent ground photos of impacted waters of the U.S.
- Illustrations depicting temporary and permanent impacts to waters of the U.S.;
- Demonstration of compliance with ESA and NHPA; and
- ADEQ Section 401 individual water quality certification (if necessary).

Following submittal of a PCN, the USACE will notify the applicant within 30 days that the package is complete or that additional information is needed. If the PCN is complete, the USACE will provide an authorization letter that may include project-specific special conditions for the proposed action. Authorization of a PCN is contingent upon a complete submittal to the USACE and receipt of concurrences from other applicable state and federal regulatory agencies, including those from Section 401 certifications from ADEQ and those related to biological and cultural resources, as applicable.

5.3.3 Individual Permit

An Individual Permit is required for actions that will involve discharging dredged or fill material into waters of the U.S. but that do not meet the conditions of a NWP. An Individual Permit application includes the completion of a USACE EA (i.e., a *Department of the Army Environmental Assessment and Statement of Finding*), which will require a public interest review and must adhere to the Section 404(b)(1) guidelines established under 40 CFR 230. A public interest review by the USACE is used to evaluate an action's impact on areas including, but not limited to, conservation, historic properties, fish and wildlife values, floodplain values, and water quality.

The Section 404(b)(1) guidelines require the action be the least environmentally damaging practicable alternative (LEDPA). This is demonstrated through an alternative analysis, which evaluates the proposed action, a No Action alternative, and other alternative(s) that meet the purpose and need. The alternative analysis should evaluate each alternative based on potential impacts to waters of the U.S. and other resources as well as cost, existing technology, and logistics. Alternatives that completely avoid Waters should be included, and both on-and off-site alternatives should be considered when feasible. The alternative that minimizes or avoids impacts to waters of the U.S. and other resources, meets the purpose and need, and is not cost prohibitive would be the preferred alternative. If impacts to waters of the U.S. cannot be avoided, the USACE may require compensatory mitigation in the form of mitigation banking, payment of in-lieu fees, or completion of permittee-responsible mitigation (refer to Compensatory Mitigation discussion below for more information). The Section 404(b)(1) guidelines also require the Individual Permit application to demonstrate that the action will not cause or contribute to the violation of other applicable state or federal environmental laws (ESA, NHPA, etc.) and will not cause any significant adverse effects on the aquatic system or

human environment. The application should demonstrate that any appropriate and practicable steps have been taken to minimize the adverse impacts on waters of the U.S. Following acceptance of a complete application, the USACE will publish a public notice. A public notice includes a mandatory 30-day comment period and is the primary method of advising all interested parties of a proposed activity for which a permit is sought. The public notice is intended to solicit public comments and information regarding potential foreseeable beneficial and detrimental impacts from the action that may not otherwise be known by the USACE or the applicant. Following the comment period, the USACE will review the application and any public comments received to determine if a FONSI is appropriate for the action. If a FONSI determination is made, the USACE will authorize the Individual Permit.

5.4 Reata Wash Study Obligations and Recommendations

It is anticipated that the construction of the potential flood control improvements associated with the Reata Wash Study would cause temporary and permanent impacts to waters of the U.S. and therefore require compliance with the CWA. The results of the preliminary review are summarized below.

5.4.1 Section 401

A review of Arizona's 2012/2014 Impaired Waters list (ADEQ 2014) indicated that no waters of the U.S. identified by ADEQ or EPA as impaired pursuant to CWA Section 303(d) are present within 1-mile of the Reata Wash Study Area. A review of the current list of OAWs indicated that no OAWs are present within 1 mile of the Reata Wash Study Area. Additionally, no tributaries to impaired waters or OAWs are present. No lakes or reservoirs are located within the vicinity of the Reata Wash Study Area.

However, since the potential flood control improvements being evaluated in the Reata Wash Study are anticipated to require a Section 404 Individual Permit, a Section 401 individual water quality certification is also anticipated. If the EPA and ADEQ update the Section 303(d) list of impaired waters or list of OAWs prior to construction, those updated lists should be reviewed to confirm that no newly listed impaired waters or OAWs are present.

5.4.2 Section 402

It is anticipated that more than 1 acre of land would be disturbed during construction activities and an AZPDES CGP would be required. Therefore, the preparation of a SWPPP would be required and should incorporate temporary control measures during construction and permanent control measures when the proposed improvements are completed. The City is an operator of a small MS4 and has an approved Stormwater Management Program through ADEQ. The SWPPP should be consistent with the MS4

General Permit requirements and conditions. The SWPPP must be completed before filing a NOI with ADEQ, which is required before beginning construction activities. Upon completion of construction activities, an NOT should be submitted to ADEQ.

5.4.3 Section 404

To evaluate the presence of potential waters of the U.S. and anticipated CWA Section 404 permitting requirements for the potential flood control improvements within the Reata Wash Study Area, aerial imagery, topographic maps, USFWS National Wetlands Inventory maps, the Arizona Department of Water Resources Water Atlas, online resource viewers, historic CWA documentation relevant to the Reata Wash Study Area, and applicable USACE guidance documents were reviewed.

Based on this review of available documentation, numerous ephemeral washes are present in the Reata Wash Study Area that are anticipated to be waters of the U.S. regulated under Section 404 of the CWA (Figure 3). These washes are identified as possessing an OHWM and other specific physical characteristics, and therefore, could be considered potential waters of the U.S. under the jurisdiction of the USACE. No intermittent or perennial waterbodies are present within the Reata Wash Study Area, and no potential wetlands or other special aquatic sites are anticipated to occur.

Reata Wash and Dobson Wash are the major drainage features within the Reata Wash Study Area. Of the total estimated 158 to 168 acres of potential waters of the U.S. within the Reata Wash Study Area, approximately 68 acres is attributed to Reata Wash and approximately 50 acres is attributed to Dobson Wash. Remaining acres consist of small, unnamed washes throughout the Reata Wash Study Area. Table 2 provides the approximate acres of potential waters of the U.S. in the Reata Wash Study Area.

Table 2. Approximate Acres of Potential Waters of the U.S. in Reata Wash Study Area

Study Area Location	Approximate Acres
Reach 1: North of Pinnacle Peak Road	7
Reach 2: Pinnacle Peak Road to Cross Canyon Way	12
Reach 3: Cross Canyon Way to Thompson Peak Parkway	6
Reach 4: Thompson Peak Parkway to Bell Road	28
Reach 5: Bell Road to the CAP Canal	15
Dobson Wash	50
Unnamed Ephemeral Washes	40 to 50

Reata Wash is an ephemeral wash that originates at the northern boundary of Reach 1 (approximately 1,700 feet north of Pinnacle Peak Road) and flows south to Reach 5 where it discharges into a stormwater basin located immediately north of the CAP Canal between WestWorld of Scottsdale and Thompson Peak Parkway. Existing drainage

infrastructure along Reata Wash includes a culvert crossing of Pinnacle Peak Road, at-grade roadway crossings of Foothills Drive and Cross Canyon Way, and modern bridge crossings of Thompson Peak Parkway, Legacy Boulevard, Bell Road, and McDowell Mountain Ranch Road. Within the limits of Reach 4, improvements completed by adjacent, private landowners include bank protection along a channelized section of Reata Wash.

Dobson Wash consists of a series of braided, ephemeral branches that break west beginning at the apex of Reata Wash floodplain, approximately 900 feet south of Pinnacle Peak Road. The limits of Dobson Wash are generally located between the Reata Wash floodplain apex and the Deer Valley Road alignment, with minor tributaries continuing downstream through the Reata Wash Study Area. Numerous single lot homes are located adjacent to the braided channels of Dobson Wash, limited flood control improvements exist.

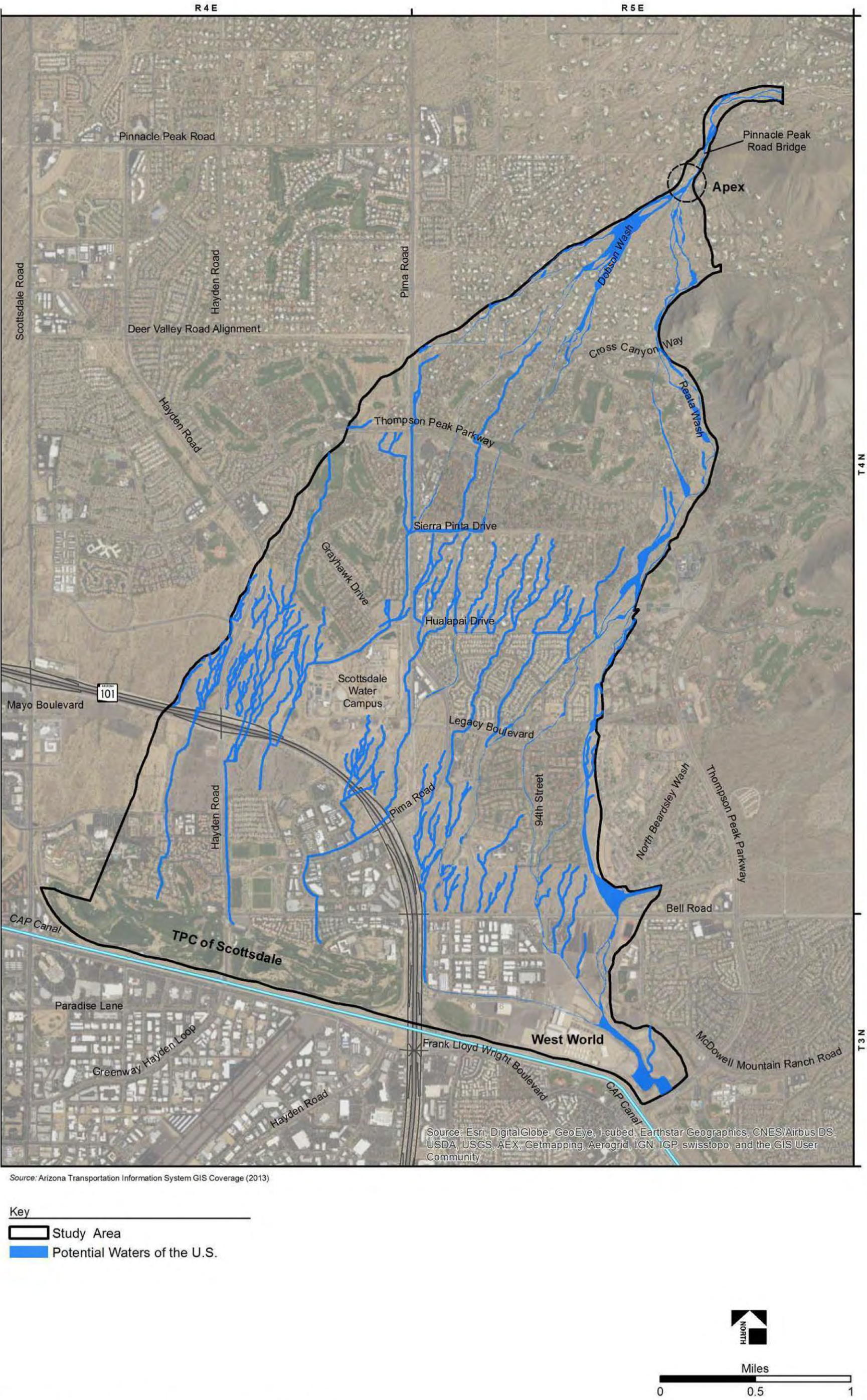


Figure 3. Location of Potential Waters of the U.S.

5.4.3.1 Jurisdictional Delineation

Based on the presence of potential waters of the U.S. within the Reata Wash Study Area and the anticipated need for a Section 404 permit, the submittal of a Preliminary or Approved JD to the USACE would be required to document the locations and extent of potentially jurisdictional waters of the U.S. At a minimum, the JD should assess the anticipated limits of disturbance (which may or may not include the entire Reata Wash Study Area), as well as the full extent of downstream waters of the U.S. that may potentially be impacted due to the proposed improvements. Following review and acceptance by the USACE, the results of the JD would be used in conjunction with the future design and disturbance footprint to determine the precise amount of anticipated impacts to waters of the U.S. and the applicable Section 404 permit.

5.4.3.2 Permitting

The City met with the USACE's Arizona Branch (Phoenix office) of the Los Angeles District Regulatory Division on February 11, 2016 and presented an overview of the Reata Wash Study, discussed the Reata Wash Study goals, and asked for feedback related to potential Clean Water Act Section 404 permitting and supporting environmental resource documentation that may be required. A second meeting occurred on June 15, 2016, at which the USACE was updated on the status of the Reata Wash Study and the USACE provided the City additional feedback regarding anticipated Section 404 requirements. While the precise level of impacts to waters of the U.S. is not known at this time, the USACE confirmed that the submittal of a Section 404 permit would likely be necessary to authorize flood control improvements in Reata Wash and/or other potential waters of the U.S. in the Reata Wash Study Area. The type of Section 404 permit (NWP or Individual) that would apply would be dependent on the location and limits of flood control improvements. In addition, the inclusion of design features that minimize impacts to waters of the U.S., including those to downstream waters of the U.S., would be a key component for consideration during the USACE review. Based on information developed as part of the Reata Wash Study and presented at the meetings, the USACE confirmed that the need for an EIS is not anticipated. The USACE stated that they would likely be the lead federal agency regardless of the level of USACE NEPA analysis or other federal agency involvement.

Authorization from the USACE would be required prior to construction activities involving discharges within waters of the U.S. If the flood control improvements are completed as one single and complete project, an Individual Permit would likely be needed due to the estimated level of impacts to waters of the U.S.

Individual Permit

An Individual Permit for the flood control improvements will require a Section 404(b)(1) alternative analysis that reviews the proposed action, a No Action alternative (i.e., alternative with no impacts to waters of the U.S.), and any other on-site alternatives that meet the purpose and need in order to identify the LEDPA. The LEDPA must minimize or avoid adverse impacts to waters of the U.S. Compensatory mitigation may also be required to offset the proposed action's overall impact to waters of the U.S. if adverse impacts cannot be avoided. Due to the nature of the proposed flood control improvements, off-site alternatives would not be feasible and would therefore not need to be evaluated in detail. The description of alternatives and associated analysis should specify the configurations, structure types, and materials (i.e., soil, concrete, riprap, etc.) considered that would, in combination, achieve the purpose and need. For example, if channelization activities occur within reaches of Reata Wash, the Section 404(b)(1) alternative analysis should include alternatives with different channel configurations that allow for the desired conveyance, the types of structures and materials used for construction, as well as costs, existing technology, and logistics. Design options that could potentially minimize or offset impacts on waters of the U.S. through reestablishing existing functions (e.g., hydrologic, geomorphic, biological, etc.) and values (i.e., ecological and societal) will be an important aspect to evaluate for the Section 404(b)(1) alternatives analysis.

Minimization and Avoidance

During the course of the Reata Wash Study, the City identified and evaluated alternative solutions that could significantly reduce potential impacts to waters of the U.S. and preserve the existing environmental conditions of the Reata Wash Study Area. These alternative solutions include:

- Installation of a covered box culvert
- Construction of wider, earthen channels
- Installation of a flow release structure at the apex of Reata Wash and Dobson Wash

The covered box culvert option would include the installation of a buried culvert structure (Figure 4; Covered Box Culvert Illustration). The culvert structure would be covered with native material at a minimum depth of 2 feet and Reata Wash could be reestablished on the surface as a natural channel along the new conveyance corridor. Landscaping consisting of native plants endemic to the Reata Wash Study Area could be planted along the banks of the reconfigured Reata Wash and within the new conveyance corridor. Once installed, a combination of the buried culvert structure and the reconfigured Reata Wash channel would be used to provide the required drainage capacity. The buried culvert structure would act to convey flows through the reaches

within the Reata Wash Study Area, and Reata Wash would continue to provide the habitat and ecological value as it currently offers.

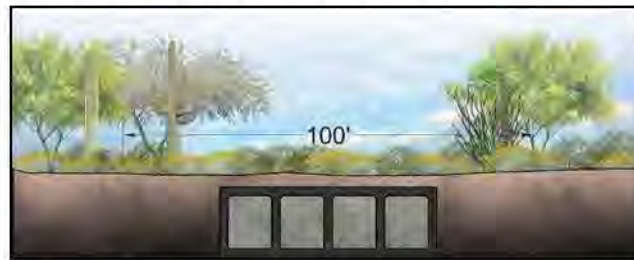


Figure 4. Covered Box Culvert Illustration

Feedback received from the USACE during the June 15, 2016 meeting indicated that a covered box culvert option that includes a reconfigured Reata Wash channel may be considered by the USACE to be a temporary impact to waters of the U.S. Depending on the extent of use, the construction of covered culvert structures could significantly reduce the amount of permanent impacts to waters of the U.S. and associated compensatory mitigation that may be required, compared to other options being reviewed (e.g., "U" channel or channel widening).

Improvements within Reata Wash or other potential waters of the U.S. that result in the establishment of wider channels could result in an increase in jurisdictional area in the Reata Wash Study Area. An increase in the acreage of waters of the U.S. within Reata Wash may help minimize impacts to potential waters of the U.S., which could result from improvements if the functions and values of the watercourse(s) or overall Reata Wash Study Area are not degraded. Options such as the grouted rock and earthen channel corridors (Figure 5) could provide an opportunity to reduce potential impacts under a Section 404 permit. An earthen channel would be the preferred option with respect to waters of the U.S. because it would provide a more natural condition.

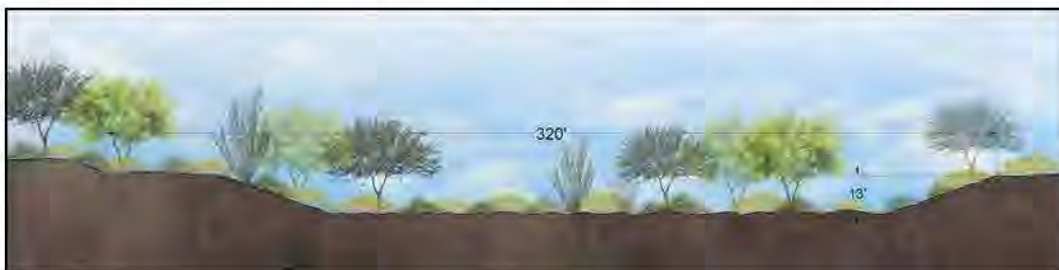


Figure 5. Earthen Channel Corridor Illustration

The Reata Wash Study concluded that it is critical to address the irregular and unpredictable nature of flows that are inherent to the alluvial fan that makes up the Reata Wash floodplain. As part of this Reata Wash Study, the City reviewed the inclusion of a release structure at the Reata Wash Study Area apex at Dobson Wash (See Figure 2). The intent of the flood control release structure would be to reduce flood risks within

the Reata Wash Study Area, but also allow for an adequate amount of flows to continue downstream within Dobson Wash and other nearby waters of the U.S. The intent would be to allow for "ordinary" flows to be released. By releasing flows through the structure, downstream impacts would be minimized or avoided because Dobson Wash and other ephemeral waters of the U.S. within the Reata Wash Study Area would continue to receive flows and incur bankfull conditions during storm events. The flood control improvements, including the release structure will be designed to ensure that downstream flows through Dobson Wash and other potential waters of the U.S. are not eliminated or significantly limited.

In addition to impacts to waters of the U.S., eliminating or significantly limiting flows to downstream waters of the U.S. would result in negative biological and ecological impacts within the Reata Wash Study Area and possibly downstream of the Reata Wash Study Area. Xeroriparian vegetation that is currently located within and adjacent to Dobson Wash is an important ecological resource in the Reata Wash Study Area, and a full diversion of downstream flows could negatively affect its health. The release structure would be designed to maintain downstream flows and therefore maintain vegetation along waters of the U.S. within and downstream of the Reata Wash Study Area. The continued release of flows through Dobson Wash and other waters of the U.S. is anticipated to leave downstream vegetation unaffected by the flood control improvements, preserving the habitat and aesthetic qualities in the Reata Wash Study Area.

The City discussed the potential for a release structure at the June 15, 2016 meeting with the USACE. The USACE agreed that the continuation of flows downstream would be an important consideration for any future permit authorization associated with the proposed flood control structures.

Compensatory Mitigation

Compensatory mitigation is anticipated to be required for the flood control improvements as a condition of a Section 404 Individual Permit. The purpose of compensatory mitigation would be to offset impacts to waters of the U.S. as a result of dredge and fill activities. The USACE's *Final 2015 Regional Compensatory Mitigation and Monitoring Guidelines for South Pacific Division USACE* (USACE 2015) defines the standardized approach and procedures for compensatory mitigation. Per the guidelines, three different forms of compensatory mitigation are available (listed in order of preference hierarchy): mitigation banks, in-lieu fee programs, and permittee-responsible mitigation. Mitigation banks and in-lieu fee programs are similar in that they sell compensatory mitigation credits to permittees (e.g., the City) whose obligation to provide compensatory mitigation is then transferred to the in-lieu fee program sponsor. However, mitigation banks and in-lieu fee programs have different rules governing their

operation and use. A list of Los Angeles District approved mitigation banks and their service area can be found on the Regulatory In-Lieu Fee and Bank Information Tracking System (RIBITS; USACE 2016). All forms follow a watershed-based approach whenever possible. Coordination with the USACE should occur during the Section 404 permit process to determine the appropriate form of compensatory mitigation and the associated requirements, if necessary.

Based on the June 15, 2016 meeting with the USACE, payment to an in-lieu fee program is the locally preferred mitigation method, but that permittee-responsible mitigation would also be acceptable. In-lieu fee programs typically involve the restoration, establishment, enhancement, and/or preservation of aquatic resources through the payment of funds to a USACE-approved governmental or non-profit natural resources management entity. The in-lieu fee amount is based on a set per acre cost of the selected program and a ratio assigned by the USACE, which ranges from 1:1 to 1:3 and is based on site characteristics. Currently, the preferred in-lieu fee program for compensatory mitigation in the Reata Wash Study Area is the Arlington Wildlife Area project which is located on the Gila River approximately 15 miles southwest of Buckeye, AZ and includes a cost of approximately \$80,000 per acre of permanent impacts to waters of the U.S.

Permittee-Responsible Mitigation consists of on- or off-site mitigation (including establishment, enhancement, and/or preservation of aquatic resources) that is undertaken by a permittee to provide compensatory mitigation for which a permittee retains full responsibility. On-site mitigation is the recommended approach in the event that Permittee-Responsible Mitigation is used. However, if an off-site location is pursued, improvements to sites within the same watershed as the impacted waters of the U.S. subject to the Section 404 permit is strongly encouraged. This compensatory mitigation method must include a plan that documents the baseline conditions within the potential mitigation area, recommends the methods and locations where mitigation will occur, and outlines an approach for monitoring the success of the mitigation.

On-site mitigation should include the salvaging of suitable vegetation that would be disturbed by construction and the selective planting of new vegetation. This will help to ensure that similar types and densities of vegetation are provided back to the Reata Wash Study Area and along natural wash corridors. Additionally, low impact development techniques, such as the use of microbasins for water harvesting, and the use of seeding should be considered to promote vegetation growth or to improve upon areas with limited vegetation growth.

When preparing the revegetation plan, which is anticipated to occur, consideration should be made to incorporate any on-site compensatory mitigation needs which may be needed as part of a Section 404 permit. This will provide an opportunity to utilize

planned revegetation activities to off-set impacts to waters of the U.S. and potentially reduce in-lieu fee requirements.

6. BIOLOGICAL RESOURCES

Federal actions require compliance with federal laws and regulations, including those protecting biological resources such as the ESA. Furthermore, documentation of ESA compliance is needed for compliance with NEPA. This section summarizes the ESA and other biological resource considerations that may be applicable to the flood control improvements being evaluated under the Reata Wash Study.

6.1 Endangered Species Act

The ESA protects threatened and endangered (T&E) species and their designated critical habitats by prohibiting take of any listed species and protecting habitats that are determined to be critical to the survival and recovery of listed species. To evaluate ESA compliance for a given federal action, a review of the action's potential effects to listed species and designated critical habitats located in the "action area" (i.e., the overall area where direct or indirect effects may occur) must be conducted. This may include informal or formal consultation with the USFWS. The USFWS's Arizona Ecological Services Field Office would be the point of contact for future coordination related to the Reata Wash Study Area.

Section 7 of the ESA [16 USC 1531 et seq.] outlines the procedures for federal interagency cooperation to conserve federally-listed species and designated critical habitats. Section 7(a)(1) requires Federal agencies to use their authorities to further the conservation of listed species. Section 7(a)(2) requires federal agencies to consult with the Services to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. ESA compliance is typically documented in a Biological Evaluation (BE) or Biological Assessment (BA) that is prepared by the lead federal agency to evaluate the presence of listed T&E species and their habitats within an action area and the effects of a proposed action. The preparation of a BE or BA can also be delegated to a project proponent or non-federal representative, though the lead federal agency is ultimately responsible for making determinations of effect with regard to listed species and critical habitats.

Federal agencies are not required to consult with the USFWS for actions that are determined to have "no effect" on listed species and critical habitats. When a federal agency determines that a proposed action "may affect" listed species or their designated critical habitats, consultation with the USFWS is required to ensure that the action will not jeopardize the continued existence of a listed species or result in the

destruction or adverse modification of any designated critical habitat. If it is determined that an action may affect, but is not likely to adversely affect a listed species or designated critical habitat, the federal agency submits the BE or BA to the USFWS for their concurrence; the USFWS reviews the BE or BA and, if they agree with the determination, provides a letter stating their concurrence within 30 days. If it is determined that an action may affect and is likely to adversely affect a listed species or designated critical habitat, the federal agency is required to enter into a formal consultation with the USFWS. Formal consultation is a more involved and lengthy process that results in the issuance of a Biological Opinion and, if needed, an Incidental Take Statement that allows for the take of a listed species in accordance with prescribed terms and conditions that must be implemented by the federal agency. Formal consultation with the USFWS can take up to 135 days to complete and the project proponent may be required to conduct species-specific protocol surveys to determine the status of a species within the action area.

6.2 Preliminary Review of the Reata Wash Study Area

6.2.1 Ecological Setting

The Reata Wash Study Area occurs within the Arizona Uplands subdivision of the Sonoran Desertscrub Biotic Community (Turner and Brown 1994), which is characterized by high temperatures, generally low precipitation, and an assemblage of plant and wildlife species that is specifically adapted to these conditions. Vegetation on the small hillsides in the Reata Wash Study Area is diverse and consists of a variety of trees, shrubs, subshrubs, and cacti that are native to the Sonoran desert and indicative of the Paloverde-Cacti- Mixed Scrub Series. Foothills paloverde (*Parkinsonia microphylla*), creosotebush (*Larrea tridentata*), triangle-leaf bursage (*Ambrosia deltoidea*), ephedra (*Ephedra* spp.), desert buckwheat (*Eriogonum deserticola*), brittlebush (*Encelia farinosa*), crucifixion thorn (*Canotia holacantha*), ocotillo (*Fouquieria splendens*), and banana yucca (*Yucca baccata*) are common in these upland areas, along with cacti including buckhorn cholla cacti (*Cylindropuntia acanthocarpa*), chainfruit cholla cacti (*Cylindropuntia fulgida*), Christmas cacti (*Cylindropuntia leptocaulis*), California barrel cacti (*Ferocactus cylindraceus*), hedgehog cacti (*Echinocereus* spp.), fishhook pincushion cacti (*Mammillaria grahamii*), saguaros (*Carnegiea gigantea*). Within major ephemeral washes, including Reata Wash and Dobson Wash, xeroriparian vegetation consisting of blue paloverde (*Parkinsonia florida*), velvet mesquite (*Prosopis velutina*), ironwood (*Olneya tesota*), catclaw acacia (*Acacia greggii*), wolfberry (*Lycium* sp.), desert hackberry (*Celtis pallida*), desert broom (*Baccharis sarothroides*), and canyon ragweed (*Ambrosia ambrosioides*). Other, smaller washes in the Reata Wash Study Area typically have a mix of upland and xeroriparian plant species.

Wildlife species observed in the survey area includes desert cottontails (*Sylvilagus audubonii*), whitethroated woodrats (*Neotoma albigula*), and many bird species including Abert's towhees (*Melospiza aberti*), house finches (*Haemorrhous mexicanus*), cactus wrens (*Campylorhynchus brunneicapillus*), curve-billed thrashers (*Toxostoma curvirostre*), verdins (*Auriparus flaviceps*), Gambel's quail (*Callipepla gambelii*), Gila woodpeckers (*Melanerpes uropygialis*), and northern cardinals (*Cardinalis cardinalis*).

6.2.2 Wildlife Movement

The Reata Wash Study Area is located in an urban fringe area and the lower density developments in the vicinity of Reaches 1 through 3 provide open space that supports live-in habitat for wildlife. As a result, there is more permeability for wildlife movement in the northern portion of the Reata Wash Study Area as compared to the southern portion. Between Thompson Peak Parkway and Bell Road (Reach 4) there are constraints to east-west wildlife movements due to the existing developments on both sides of Reata Wash. However, the wash itself provides a corridor for north-south movements, and bridged crossings at Legacy Boulevard and Thompson Peak Parkway currently accommodate such north-south movements. Within Reach 5 there is little wildlife habitat remaining adjacent to Reata Wash and this reach lacks connectivity to the McDowell Mountains or other natural habitat areas except through the Reata Wash corridor.

6.2.3 Special Status Species

The USFWS Information, Planning and Conservation (IPaC) system was accessed to obtain a list of threatened, endangered, proposed, and candidate species occurring in the Reata Wash Study Area at the time of this memorandum. The species distribution information and habitat requirements for each species on the list were reviewed in relation to the Reata Wash Study Area. Based on the review of the IPaC species list, it was determined that there is no suitable habitat present for any listed T&E species, or candidate species in the Reata Wash Study Area or in the immediate vicinity (i.e., within 0.25 mile of the Reata Wash Study Area) and no listed species are anticipated to be affected by activities within the Reata Wash Study Area. In addition, a list of special status species occurring in the vicinity of the Reata Wash Study Area was obtained using the Arizona Game and Fish Department's (AGFD) On-line Environmental Review Tool. The AGFD On-line Environmental Review Tool indicated that the Sonoran desert tortoise (*Gopherus morafkai*) has been documented as occurring within the Reata Wash Study Area. The Sonoran desert tortoise is considered a Species of Greatest Conservation Need in Arizona's State Wildlife Action Plan. The southern portion of the Reata Wash Study Area contains habitat for the Sonoran desert tortoise. The northern portion of the Reata Wash Study Area includes some tortoise habitat as well, and is in close proximity to habitat on the slopes of the McDowell Mountains and tortoises may use these adjacent habitats for foraging. If the City council authorizes the Reata Wash Study move forward into design,

the USFWS IPaC list and AGFD On-line Environmental Review Tool should be re-evaluated to confirm that no additional species have been listed that may be affected by the action.

6.2.4 ESA Compliance During a CLOMR Review

Per FEMA's Procedure Memorandum 64-Compliance with the Endangered Species Act (ESA) for Letters of Map Change (FEMA 2010) and their Overview Endangered Species Act Compliance for Conditional Letters of Map Change (FEMA 2016), all CLOMR and CLOMR-F applicants are responsible for providing documentation that demonstrates to FEMA that ESA compliance has been achieved prior to FEMA approval. Applicants are requested to provide documentation and concurrences received from the USFWS as part of a Section 7 process, such as a "not likely to adversely affect" determination, or a statement of "no effect" on proposed or listed species or their designated critical habitat, as applicable.

For actions where FEMA is not the lead federal agency, the applicant should coordinate with the applicable lead federal agency regarding Section 7 ESA compliance and provide the applicable documentation to FEMA. Once completed, it is recommended that the biological document (e.g., BE or BA) be forwarded to FEMA to support the CLOMR review.

For actions that do not require consultation with the USFWS, FEMA recommends providing responses to the following questions:

- A description of the action to be considered;
- A description of the specific area that may be affected by the action;
- A description of all federally listed (T&E) species and critical habitat that may be affected by the action;
- A description of the manner in which the action may affect each of the listed species or critical habitat and an analysis of any cumulative effects;
- Relevant reports, including any environmental impact statement, environmental assessment, or biological assessment prepared; and
- Any other relevant available information on the action, the affected listed species, and critical habitat.

6.3 Reata Wash Study Obligations and Recommendations

Preparation of a BE is anticipated to be needed to support the agency-specific environmental compliance documents (e.g., CE, EA, Section 404 permit application) for the implementation of flood control improvements within the Reata Wash Study Area. The BE should provide a description of the proposed action, a summary of any ESA-listed species and designated critical habitat present within the Reata Wash Study Area, a

summary of any species of concern for applicable state and federal agencies within the action area, and an evaluation of potential impacts to each species in the action area. While species-specific protocol surveys are not anticipated to be necessary, a qualified biologist should complete a reconnaissance level site survey and obtain photographs of the Reata Wash Study Area in support of the analysis.

The analysis of potential impacts to T&E species from the flood control improvements should also include an assessment of direct, indirect, and cumulative effects to each, and appropriate conservation strategies and mitigation measures should be developed for each species, as needed. Following a thorough evaluation of an action's affect to biological resources, the lead federal agency should determine if the action has "no effect" on listed species and designated critical habitats, or that the action "may affect" listed species or their designated critical habitats. Based on preliminary biological resource information and the proposed flood control improvements being evaluated in the Reata Wash Study, it is anticipated that the proposed improvements would have "no effect" to listed species or their designated critical habitats. However, if the action is determined to have a "may affect" finding, the City would need to initiate the Section 7 consultation with the USFWS through the designated lead federal agency to obtain concurrence on the affect determination and to confirm any additional conservation strategies and mitigation measures. While the appropriate lead federal agency cannot be determined at this time, it is currently anticipated that the USACE will act as the lead agency and would be responsible for Section 7 consultation with the USFWS, if needed. Although not anticipated, Reclamation and/or FEMA could elect to complete separate consultation as part of their agency-specific NEPA process.

In order to reduce impacts to wildlife, including special status species, any design for the flood control improvements within Reata Wash should take into consideration the continued permeability of wildlife across Reata Wash, as well as the continued egress along its existing or modified channel bottom. Improvements within the immediate channel bottom of Reata Wash, including those related to drop structures, culverts, dissipaters, and inlet/outlet structures should also allow for continued wildlife movement upstream and downstream of any structure to maintain north-south wildlife movement through the Reata Wash corridor. The *AGFD Guidelines for Culvert Construction to Accommodate Fish & Wildlife Movement and Passage* (AGFD 2006) provides guidelines to assist in the design, planning, and placement of culverts to minimize impacts to wildlife passage and movement.

Any implementation of flood control improvements that require the reconfiguration of the Reata Wash cross-sections should consider the ability for wildlife to access the channel and to move along/across it within the each of the Reata Wash Study reaches. Channel slopes at 2:1 or greater appear to be favorable for ingress and egress by wildlife, including the Sonoran desert tortoise. However, the use of large angular rock for

rip-rap can be difficult for some species to traverse. The use of closed or covered culverts would also reduce impacts to wildlife movement since the ground surface would remain generally level without steep slopes. The inclusion of concrete or soil-cement paths (Figure 6) designed to allow for the movement of the Sonoran desert tortoise and other small mammal could also be implemented to assist in the ingress and egress of this species through the Reata Wash channel and Reata Wash Study Area reaches, such as Reaches 1 through 3. These features are provided at more frequent intervals to provide wildlife access through rip-rapped segments. In general, the use of animal or tortoise fencing throughout the Reata Wash Study Area is not recommended because it would decrease the ability for wildlife movement across the channel.



Figure 6. Example Concrete Path for Wildlife Movement
Photograph courtesy of Arizona Department of Transportation

Configurations to the Reata Wash channels that create steep slopes, such as a concrete “U” channel (Figure 7), would be less favorable for wildlife attempting to cross the channel. The construction of a “U” channel within the Reata Wash Study Area could potentially create a hazard to wildlife. In situations where a “U” channel is the proposed solution, fencing or other measures to restrict access and guide wildlife to more accessible portions of the channel could be included to reduce or eliminate the potential hazard to wildlife. Due to the likelihood of the Sonoran desert tortoise occurring within the Reata Wash Study Area, the use of tortoise-proof fencing is recommended for any locations where a “U” channel is required.

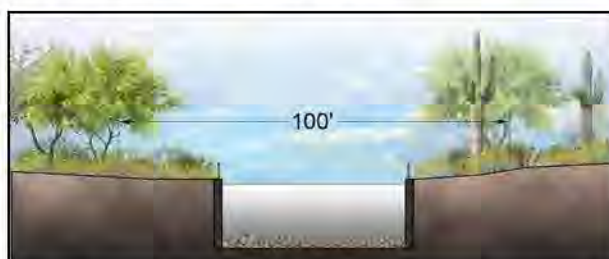


Figure 7. “U” Channel Illustration

Bridged crossings can be implemented to maintain connectivity across the wash. Ideally these crossings would have a natural substrate and could support growing plants such as shrubs or grasses to encourage their use by wildlife. The AGFD has published recommended mitigation measures for the Sonoran desert tortoise, which include the construction of culverts at every mile of new roads or railroads but that may also be applicable for an impassible "U" channel corridor. Given the linear nature of the Reata Wash channel in the Reata Wash Study Area, the installation of bridged crossings at a minimum of one-mile intervals could be beneficial for promoting wildlife movement across the Reata Wash, especially in Reaches 1 through 3 where there is greater connectivity to adjacent wildlife habitats.

The AGFD's *Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects* (Appendix B) should be followed to ensure safe handling in the event that a Sonoran desert tortoise is encountered during construction. Additional measures that could be implemented to minimize and avoid conflicts with the Sonoran desert tortoise include the implementation of construction worker awareness training, the use of a biological monitor during construction, and the installation of temporary and/or permanent fencing.

7. CULTURAL RESOURCES

Federally funded actions or actions that require federal permits or clearances must comply with Section 106 of the NHPA. Section 106 dictates the need for federal agencies to identify National Register of Historic Places (NRHP)-eligible and listed properties, consider any effects the action may have to historic properties, and conduct consultation with the SHPO, Native American Tribes, land-managing agencies, and other interested parties.

7.1 Reata Wash Study Obligations and Recommendations

A Class I cultural resource inventory was completed to research the extent of previous cultural resources survey and to identify known cultural resources sites within the Reata Wash Study Area and surrounding one-mile wide buffer. Records were gathered from the SHPO and the Arizona State Museum (ASM) via AZSITE, the statewide electronic inventory of cultural resources. Electronic copies of General Land Office and historic U.S. Geological Society topographical maps available for the Reata Wash Study Area, as well as the National Register Information System was accessed to collect information on historic buildings and structures NRHP-listed properties that may be located within the Reata Wash Study Area. The results of the review are provided in "A Class I Cultural Resources Inventory for the Reata Wash Flood Control Improvement Study, Scottsdale, Maricopa County, Arizona" (Appendix C).

Research indicates that approximately 71 percent of the Study Area has been previously surveyed for cultural resources. In all, 17 sites have been recorded within the Reata Wash Study Area; of these, 4 have been determined eligible for nomination to the NRHP by SHPO.

If the City council authorizes the Reata Wash Study move forward into design, it is recommended that the location of potential improvements be reviewed with respect to the results of the Class I research to determine the need for additional cultural resource survey and reporting. Depending on the location of potential improvements and associated ground disturbance, a new Class III survey may be needed in portions of the Reata Wash Study Area where previously conducted surveys do not meet current standards or where survey has not yet been completed.

8. SUMMARY

Appendix A. Table 1. Summary of Potential Reata Wash Study Obligations and Recommendations includes a list of applicable agencies and their corresponding environmental compliance requirements as well as:

- estimated review timeframes
- appropriate agency contact
- associated fees
- applicable agency publication and guidance

Recommendations provided in this Environmental Memorandum are based on a preliminary review of available information and are intended for planning purposes during the Reata Wash Study. If the City council authorizes the Reata Wash Study move forward into design, this information should be reevaluated due to the potential for future regulatory changes and modifications to proposed flood control improvements. This Environmental Memorandum is not intended to be a comprehensive summary of all environmental resources, but only those resources and their managing agencies that have been identified in preliminary reviews to be potential requirements.

9. REFERENCES

- ADEQ. 2012. Clean Water Act 401 Certification for Nationwide Permits–March 18, 2012. March 16.
- _____. 2016a. eMaps: Impaired Waters.
<https://gisweb.azdeq.gov/arcgis/emaps/?topic=impaired>. Accessed May 19, 2016.
- _____. 2016b. Water Quality Division: Permits: Arizona Pollutant Discharge Elimination System (AZPDES). <http://legacy.azdeq.gov/environ/water/permits/azpdes.html>. Site accessed June 23, 2016.
- Arizona Department of Water Resources. 2010. Arizona Water Atlas Volume 8, Active Management Area Planning Area. April.
http://www.azwater.gov/azdwr/StatewidePlanning/WaterAtlas/ActiveManagementAreas/documents/Volume_8_TOC_final.pdf
- AGFD. 2006. Guidelines for Culvert Construction to Accommodate Fish & Wildlife Movement and Passage.
<http://www.azgfd.gov/hgis/pdfs/CulvertGuidelinesforWildlifeCrossings.pdf>. Arizona Game and Fish Department, Habitat Branch. November 2006
- _____. 2016. Arizona's On-line Environmental Review Tool. <http://www.azgfd.gov/hgis/>. Accessed May 19, 2016.
- USACE (US Army Corps of Engineers). 2011. Ordinary High Flows and the Stage–Discharge Relationship in the Arid West Region. ERDC/CCREL TR-11-12. Cold Regions Research and Engineering Laboratory. July 2011.
- _____. 2008b. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0). Environmental Laboratory, ERDC/EL TR-08-13. Corps Engineer Research and Development Center. September 2008.
- _____. 1988. *Engineer Regulation 200-2-2: Procedures for Implementing NEPA*.
http://planning.usace.army.mil/toolbox/library/ERs/ER200-2-2_4Mar1988.pdf
- _____. 2012a. 2012 Nationwide Permit Final Decision Documents.
<http://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/Nationwide-Permits/2012-Nationwide-Permits-Final-Decision-Documents/>
- _____. 2012b. *Special Public Notice Nationwide Permits for Arizona*. US Army Corps of Engineers, Los Angeles District, Regulatory Division/Arizona Branch.
http://www.spl.usace.army.mil/Portals/17/docs/regulatory/Permit_Process/SPN_AZ_NWP.pdf
- _____. 2015. Final 2015 Regional Compensatory Mitigation and Monitoring Guidelines for South Pacific Division USACE.
<http://www.spd.usace.army.mil/Portals/13/docs/regulatory/mitigation/MitMon.pdf>

- _____. 2016. Regulatory In-lieu Fee and Bank Information Tracking System (RIBITS).
https://corpsmapz.usace.army.mil/ribits_apex/f?p=107:2:
- DHS (Department of Homeland Security) 2015. *Instruction Manual 023-01-001-01, Rev 01 "Implementing the National Environmental Policy Act"*.
https://www.dhs.gov/sites/default/files/publications/DHS_Instruction%20Manual%20023-01-001-01%20Rev%2001_508compliantversion.pdf
- EPA (US Environmental Protection Agency). 2015. Clean Water Rule.
<https://www.epa.gov/cleanwaterrule>. Last updated on December 4, 2015.
- _____. 2016. My WATERS Mapper. <http://watersgeo.epa.gov/mwm/>. Site accessed May 14, 2012.
- FEMA (Federal Emergency Management Agency). 1996. FEMA's NEPA Desk Reference, Version III - May 14, 1996. http://www.fema.gov/media-library-data/20130726-1627-20490-9434/nepa_desk_reference.pdf
- _____. 2013. Flood Insurance Rate Map, Maricopa County, Arizona and Incorporated Areas. Map Numbers 04013C1310L, 04013C1320L, 04013C1330L, and 04013C1340L. Maps revised October 16, 2013.
- _____. 2010. Procedure Memorandum 64-Compliance with the Endangered Species Act (ESA) for Letters of Map Change. [http://www.fema.gov/media-library-data/582977900b4cb234f3eb0e3ecba8746c/Procedure+Memorandum+64+-+Compliance+with+the+Endangered+Species+Act+\(ESA\)+for+Letters+of+Map+Change.pdf](http://www.fema.gov/media-library-data/582977900b4cb234f3eb0e3ecba8746c/Procedure+Memorandum+64+-+Compliance+with+the+Endangered+Species+Act+(ESA)+for+Letters+of+Map+Change.pdf). August 18, 2010.
- _____. 2012. FEMA National Environmental Policy Act Website.
<https://www.fema.gov/environmental-planning-and-historic-preservation-program/national-environmental-policy-act>.
- Hendricks, D. M. 1985. *Arizona Soils*. A Centennial Publication of the College of Agriculture, University of Arizona, Tucson.
- Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. The National Wetland Plant List: 2016 wetland ratings. *Phytoneuron* 2016-30: 1-17. Published 28 April 2016. ISSN 2153 733X http://wetland_plants.usace.army.mil/
- Reclamation (US Bureau of Reclamation). 2012. *Reclamation's NEPA Handbook*. U.S. Department of the Interior, Bureau of Reclamation. February 2012.
- Turner, R. M. and D. E. Brown. 1994. "Sonoran Desertscrub." In *Biotic Communities of the Southwestern United States and Northwestern Mexico*, edited by D. E. Brown, 181–221. University of Utah Press, Salt Lake City.
- USFWS (U.S. Fish and Wildlife Service). 2015. Species status assessment for the Sonoran desert tortoise. Version 1.0, September 2015. U.S. Fish and Wildlife Service, Southwest Region, Albuquerque, NM.

- _____. 2016. National Wetlands Inventory – Wetlands Mapper.
<http://www.fws.gov/wetlands/Wetlands-Mapper.html>. Website accessed May 13, 2016.
- US Government Publishing Office. 2016. Electronic Code of Federal Regulations.
<http://www.ecfr.gov/cgi-bin/ECFR?page=browse>. Site accessed June 2016.

10. RELEVANT LAWS, REGULATIONS, POLICIES, AND EXECUTIVE ORDERS

Table 3. Summary of Primary Federal and State Laws, Regulations, Policies, and Executive Orders Relevant to the Reata Wash Flood Control Improvement Study Area

Authority	Description
American Indian Religious Freedom Act of 1978 (42 USC 1996)	This act is intended to protect Native American religious practices, ethnic heritage sites, and land uses.
Antiquities Act of 1906 (16 USC 431-433)	Provides for the protection of historic or prehistoric remains and sites of scientific value on federal lands, establishes criminal sanctions for unauthorized destruction or removal of antiquities, authorizes the President to establish national monuments by proclamation, and authorizes the scientific investigation of antiquities on federal lands, subject to permit and regulations.
Arizona Native Plant Law (ARS 3-904)	The Arizona Department of Agricultural requests that landowners provide a Notice of Intent to Clear Land prior to the removal of State protected native plants.
Arizona State Land Department (A.R.S. § 37-461)	Grants of rights-of-way and sites for public uses of ASLD land will require the submittal of a Right-of-Way application and environmental documentation to review impacts to resources.
Bald and Golden Eagle Protection Act (16 USC 668)	Provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the take, possession, and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the act.
Clean Air Act (42 USC 7401 et seq., as amended)	The CAA regulates air emissions and pollutants from area, stationary, and mobile sources to improve air quality. The CAA authorized the EPA to establish national ambient air quality standards to protect public health and the environment.
Clean Water Act (33 USC 1251 et seq.)	The CWA requires states to set standards to protect water quality, including regulation of storm water and wastewater discharges during construction and operation of a facility. Section 404 authorizes the USACE to regulate the discharge of dredged or fill material to waters of the U.S. and adjacent wetlands. The USACE issues Individual site-specific or general (Nationwide) permits for such discharges. Section 404 Permits are not granted without prior 401 certification.

Authority	Description
CWA Section 401 – Water Quality Certification	The Section 401 water quality certification program administrated by ADEQ is required for any action subject to Section 404 of the CWA. Section 401 of the CWA requires any applicant requesting a federal permit or license for activities that may result in discharge into waters of the U.S. of the US to first obtain a Section 401 certification from the state in which the discharge originates. Section 303(d) of the CWA requires states to develop a list of impaired waters that do not meet water quality standards, establish priority rankings, and develop action plans, called "total maximum daily loads" to improve water quality.
CWA Section 402	The NPDES Program is authorized under Section 402 of the CWA and provides the statutory basis and structure for regulating the discharge of pollutants from any point or non-point sources into waters of the U.S., including sediment and construction debris-related pollutants that can be generated during ground-disturbing activities and transported by storm water runoff. ADEQ is the authority to implement at a State level, the AZPDES Program. AZPDES permits require the project be designed to protect waters of the U.S., the implementation of erosion control BMPs, and a SWPPP for construction activities exceeding 1 acre of ground disturbance.
Endangered Species Act of 1973 (16 USC 1531 et seq. and 50 CFR 17.1 et seq., as amended)	The ESA provides for the federal protection of threatened plants, invertebrates, fish, and wildlife. The USFWS administers the ESA. The ESA provides for the listing of T&E species, requires consultation with the USFWS on federal projects, prohibits the taking of listed T&E species, and provides for permits to allow the incidental taking of T&E species.
EO 11988, Floodplain Management, as amended May 24, 1977	This Executive Order requires each federal agency to avoid, to the extent possible, impacts associated with the occupancy and modification of floodplains and to avoid supporting floodplain development when there is a practicable alternative.
EO 11990 Protection of Wetlands (42 FR 26961) May 24, 1977	This Executive Order directs each federal agency to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands in carrying out its responsibilities.

Authority	Description
EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, February 11, 1994	This Executive Order directs each federal agency to achieve environmental justice as part of its mission by identifying and addressing disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.
EO 13112, Invasive Species, February 3, 1999	This Executive Order requires federal agencies to take actions to prevent the introduction and spread of invasive species, provide for their control, and minimize the economic, ecological, and human health impacts of invasive species.
EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, January 10, 2001	The Executive Order makes it unlawful to take or possess any migratory nongame bird or any part of such bird as designated in the Migratory Bird Treaty Act.
EPA Section 404(b) (1) guidelines (40 CFR 230 et seq.)	Section 404(b) (1) requires the EPA to analyze alternatives to consider the avoidance and minimization of impacts to the extent practicable to determine whether a proposed discharge to waters of the U.S. of the United States can be authorized.
Federal Noxious Weed Act of 1974, as amended	This act established a federal program to control the spread of noxious weeds. The Secretary of Agriculture is authorized to designate plants as noxious weeds. The movement of all such weeds in interstate or foreign commerce is prohibited except under permit.
Migratory Bird Treaty Act (16 USC 703–711)	This act makes it unlawful to take or possess any migratory bird (or any part of such migratory bird including active nests) as designated unless permitted by regulation (for example, duck hunting).
National Historic Preservation Act of 1966 (16 USC 470, as amended)	The NHPA provided for the establishment of the NRHP to include historic properties that are significant in American history, architecture, archeology, and culture. Section 106 of the NHPA requires federal agencies to take into account the effect of a proposed undertaking on resources listed or eligible for listing on the NRHP.
National Environmental Policy Act of 1969 (NEPA)	NEPA (42 USC 4321 et seq.) establishes policy and goals for the protection, maintenance, and enhancement of the environment. NEPA requires federal agencies to consider the environmental impacts of their proposed discretionary actions during their decision making processes and provides a mechanism for meeting many environmental reviews and approvals.

Authority	Description
Native American Graves Protection and Repatriation Act of 1990	The Native American Graves Protection and Repatriation Act (NAGPRA) provides a process for museums and federal agencies to return Native American cultural items to lineal descendants, and culturally affiliated Indian tribes and Native Hawaiian organizations. NAGPRA Also includes provisions for unclaimed and culturally unidentifiable Native American cultural items, intentional and inadvertent discovery of Native American cultural items, and penalties for noncompliance and illegal trafficking. The excavation and inadvertent discovery provisions of NAGPRA apply only to federal and tribal lands
Maricopa County Rule 310 - Fugitive Dust from Dust-Generating Operations	Establishes limits for the emissions of particulate matter into the ambient air from any property, operations, or activity that may serve as a fugitive dust source within Maricopa County.
City of Scottsdale Native Plant Ordinance - Article V, Chapter 46, Sections 105–120 of the Scottsdale Revised Code	The Native Plant Ordinance requires any project that affects plants from the specified protected plant list is required to submit a native plant program detailing the existing location and proposed treatment of each protected plant impacted.

APPENDIX A

Table 1. Summary of Potential Reata Wash Study Obligations and Recommendations

Table 1. Summary of Potential Reata Wash Study Obligations and Recommendations
 Reata Wash Flood Control Improvement Study

August 2016

Regulation	Agency	Resource	Clearance Type/Project Requirement	Review/ Approval Time	Relevant Guidance Document	Requirements	Agency Fee	Study Applicability	Study Recommendations	Website Reference
National Environmental Policy Act	U.S. Army Corps of Engineers	Waters of the U.S.	Environmental Assessment and Statement of Findings	9 to 12 Months	Section 404(b)(1) Guidelines	<ul style="list-style-type: none"> Activities must demonstrate that discharges to waters of the U.S., either individually or cumulatively, will not result in unacceptable adverse effects on the aquatic ecosystem. Activity must demonstrate that discharges within waters of the U.S. are the least environmentally damaging practicable alternative. 	No agency review fee	<ul style="list-style-type: none"> Preliminary coordination with the USACE, has indicated that the USACE is anticipated to be the lead federal agency for the flood control improvements being evaluated under the Reata Wash Study. The NEPA process would therefore be documented according to the USACE's Environmental Assessment and Statement of Findings. It is anticipated that a Section 404 Individual Permit will be necessary for the proposed flood control improvements, therefore, a Section 404(b)(1) Alternative Analysis that reviews the least environmentally damaging practicable alternative would be necessary. 	<ul style="list-style-type: none"> Coordination with the USACE' Arizona Branch (Phoenix office) is recommended to discuss the potential improvements, to review lead federal agency responsibilities, and to identify resources of concern for evaluation during the NEPA process. 	Los Angeles District US Army Corps of Engineers: http://www.spl.usace.army.mil/Missions/Regulatory.aspx

Table 1. Summary of Potential Reata Wash Study Obligations and Recommendations
 Reata Wash Flood Control Improvement Study

Regulation	Agency	Resource	Clearance Type/Project Requirement	Review/ Approval Time	Relevant Guidance Document	Requirements	Agency Fee	Study Applicability	Study Recommendations	Website Reference
National Environmental Policy Act (Continued)	Bureau of Reclamation	Public Land	Categorical Exclusion	3 to 6 Months	Reclamation's NEPA Handbook	The Reclamation NEPA process is initiated if the proposed action would cause effects on the human environment and the action is subject to Reclamation control and responsibility, such as the construction of a project on lands managed by Reclamation, obtaining or granting of a permit, or federal funding provided via Reclamation.	No agency review fee	<ul style="list-style-type: none"> Reclamation lands are located within Reach 5 of the Reata Wash Study Area. Improvements within Reach 5 which must utilize Reclamation managed lands would require coordination with the Reclamation and the preparation of NEPA documentation to support the proposed action. 	<ul style="list-style-type: none"> Coordination with the Reclamation Phoenix Area Office is recommended to discuss the potential improvements, to review preliminary design, and to identify resources of concern for evaluation during the NEPA process. The City should refer to the <i>Reclamation's NEPA Handbook</i> for information related to Reclamation's NEPA process and associated technical resource requirements. It is recommended that the City keep Reclamation informed on the status of other Reata Wash Study related improvements outside of Reach 5 and provide completed environmental and engineer information to allow Reclamation to respond to public inquiries and confirm compliance with related Reclamation requirements. 	Reclamation's NEPA Handbook: http://www.usbr.gov/nepa/
			Environmental Assessment	9 to 12 Months						

Table 1. Summary of Potential Reata Wash Study Obligations and Recommendations
 Reata Wash Flood Control Improvement Study

August 2016

Regulation	Agency	Resource	Clearance Type/Project Requirement	Review/ Approval Time	Relevant Guidance Document	Requirements	Agency Fee	Study Applicability	Study Recommendations	Website Reference
National Environmental Policy Act (Continued)	Federal Emergency Management Agency	Floodplains	Categorical Exclusion	3 to 6 Months	<ul style="list-style-type: none"> FEMA's NEPA Desk Reference Instruction Manual 023-01-001-01, Rev 01 "Implementing the National Environmental Policy Act" 	Any action that FEMA initiates or funds whether through program funds (such as mitigation, public assistance, flood insurance, etc.), funds provided to states or municipalities, or internal administrative or construction expenditures must undergo environmental review pursuant to NEPA unless that action is statutorily excluded from NEPA.	No agency review fee	In the event that FEMA funding is utilized for the implementation of floodplain mitigation, NEPA compliance and the completion of supporting environmental resource documentation will be necessary.	<ul style="list-style-type: none"> The City should refer to the FEMA's NEPA Desk Reference for information related to the FEMA NEPA process and associated technical resource requirements and Instruction Manual 023-01-001-01, Rev 01 "Implementing the National Environmental Policy Act". 	NEPA Reference Desk: http://www.fema.gov/media-library/assets/documents/13165 Instruction Manual 023-01-001-01, Rev 01 "Implementing the National Environmental Policy Act". https://www.dhs.gov/sites/default/files/publications/DHS_Instruction%20Manual%20023-01-001-01%20Rev%2001_508compliantversion.pdf
			Environmental Assessment	3 Months to 1 Year						

Table 1. Summary of Potential Reata Wash Study Obligations and Recommendations
 Reata Wash Flood Control Improvement Study

August 2016

Regulation	Agency	Resource	Clearance Type/Project Requirement	Review/ Approval Time	Relevant Guidance Document	Requirements	Agency Fee	Study Applicability	Study Recommendations	Website Reference
Clean Water Act Section 401 Water Quality Certification	Arizona Department of Environmental Quality	Waters of the United States	CWA Section 401 Individual Water Quality Certification	<ul style="list-style-type: none"> • Approved within 90 days. • Section 404 Individual Permits, request cannot occur until Public Notice is issued. 	Clean Water Act 401 Certification for Nationwide Permits-March 18, 2012	<p>Activities are conditionally certified unless:</p> <ul style="list-style-type: none"> • Do not meet General Conditions • Located in or within 1 mile upstream or 1/2 mile downstream from an impaired or Outstanding Arizona Waters • Project requires a CWA Section 404 Individual Permit 	No fee is required by ADEQ.	<ul style="list-style-type: none"> • No impaired or Outstanding Arizona Waters are located within or 1/2 mile of the Reata Wash Study Area. • If a Section 404 permit is necessary for the implementation of flood control improvements a Section 401 individual water quality certification will be required. 	<ul style="list-style-type: none"> • The City should review compliance with the General Conditions of ADEQ's Clean Water Act 401 Certification for Nationwide Permits— March 18, 2012 to determine the need for Section 401 individual water quality certification for any proposed improvements within potential waters of the U.S. • The City should review the current EPA and ADEQ CWA Section 303(d) list of impaired Waters and OAW to determine the need for Section 401 individual water quality certification for proposed improvements within listed Waters of the U.S. 	<p>ADEQ Water Quality Division: CWA 401 Water Quality Certification Program https://azdeg.gov/enviro/water/permits/cwa401.html</p> <p>Impaired and OAW https://gisweb.azdeg.gov/arcgis/emaps/?topic=impaired</p>

Table 1. Summary of Potential Reata Wash Study Obligations and Recommendations
 Reata Wash Flood Control Improvement Study

August 2016

Regulation	Agency	Resource	Clearance Type/Project Requirement	Review/ Approval Time	Relevant Guidance Document	Requirements	Agency Fee	Study Applicability	Study Recommendations	Website Reference
CWA Section 402 Arizona Pollutant Discharge Elimination System Construction General Permit	Arizona Department of Environmental Quality	Waters of the United States	Notice of Intent	Within 7 Days	Arizona Pollutant Discharge Elimination System Construction General Permit (Permit No. AZG2013-001)	Submittal of a Notice of Intent to ADEQ is required if coverage under the AZPDES CGP is applicable.	NOI fees are assessed annually as follows: <ul style="list-style-type: none"> • Less than or equal to 1 acre of ground disturbance=\$250.00 • Greater than 1 acre of ground disturbance=, but less than or equal to 50 acres of ground disturbance= \$350.00 • Greater than 50 acres of ground disturbance= \$500.00 			
			Notice of Termination	NA		Submittal of a Notice of Termination is required once the site is stabilized (> than 70% coverage) and in a condition that no longer requires stormwater controls.	No agency review fee			
			Stormwater Pollution Prevention Plan	Within 30 Days		Projects which exceed 1 acre of ground disturbance are required to prepare and maintain a SWPPP for a project. Submittal of a SWPPP to ADEQ is required if 1) Any portion of a construction site is located within 1/4 mile of a receiving water listed as impaired under section 303(d) of the Clean Water Act, 2) Any portion of the construction site is located within 1/4 mile of a receiving water listed as an OAW in A.A.C. R18-11-112(G), 3) ADEQ requests a copy of the site SWPPP for review.	If ADEQ review is required, agency review fee is \$1,000			
								<ul style="list-style-type: none"> • No impaired or Outstanding Arizona Waters are located within or 1/4 mile of the Reata Wash Study Area. • Ground disturbing activities to occur within the Reata Wash Study Area and exceed 1 acre should produce a SWPPP and submit the necessary NOI and NOT to ADEQ. 	<ul style="list-style-type: none"> • The City should review the conditions of the current AZPDES CGP and implement BMPs to control sediment and stormwater run-off which could result from construction activities. If necessary, the City should prepare a SWPPP that meets the requirements of the CGP and should submit an NOI to ADEQ prior to the start of improvements. Following completion of improvements a NOT should be submitted to ADEQ. 	Water Quality Division: Stormwater Construction General Permit https://azdeq.gov/enviro/water/permits/cgp.html

Table 1. Summary of Potential Reata Wash Study Obligations and Recommendations
Reata Wash Flood Control Improvement Study

August 2016

Regulation	Agency	Resource	Clearance Type/Project Requirement	Review/ Approval Time	Relevant Guidance Document	Requirements	Agency Fee	Study Applicability	Study Recommendations	Website Reference
CWA Section 404	U.S. Army Corps of Engineers	Waters of the United States	Section 404 Jurisdictional Determination	1 to 3 Months	<ul style="list-style-type: none"> • <i>A Field Guide to the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States</i>, August 2008 • Ordinary High Flows and the Stage– Discharge Relationship in the Arid West Region • Regulatory Guidance Letter No. 08-02, June 26, 2008 • Corps of Engineers Wetland Delineation Manual, January 1987 • Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0), September 2008 	Completion of a Section 404 Jurisdictional Delineation (Preliminary or Approved) is considered necessary for determining future permitting requirements and is a prerequisite for a permit applications.	No agency review fee.	<ul style="list-style-type: none"> • Several known and potential Waters of the U.S., including Reata Wash and Dobson Wash, are anticipated to exist with the Reata Wash Study Area. • Evaluation could be completed via the Corps' Preliminary or Approved jurisdictional delineation process. 	<ul style="list-style-type: none"> • It is recommended that the City complete CWA Section 404 Preliminary or Approved JD to document the locations and extent of potentially jurisdictional Waters of the U.S. which could be affected by future improvements. The City should submit a JD to the Corps for acceptance or approval of potential waters of the U.S. within the survey area of the JD. Prior to the preparation of a JD, it is also recommended that the City coordinate with the Corps to confirm an appropriate survey boundary and any survey area specific information which should be included in a submittal. • The City should review the Corps' Ordinary High Flows and the Stage– Discharge Relationship in the Arid West Region manual for consideration when determining appropriate release volumes at the Reata Wash/Dobson Wash apex. 	Jurisdictional Determinations: http://www.spl.usace.army.mil/Missions/Regulatory/JurisdictionalDetermination.aspx

Table 1. Summary of Potential Reata Wash Study Obligations and Recommendations
Reata Wash Flood Control Improvement Study

August 2016

Regulation	Agency	Resource	Clearance Type/Project Requirement	Review/ Approval Time	Relevant Guidance Document	Requirements	Agency Fee	Study Applicability	Study Recommendations	Website Reference
CWA Section 404 (Continued)	U.S. Army Corps of Engineers	Waters of the United States	Section 404 Nationwide Permit No. 43 (Stormwater Management Facilities)	1 to 3 Months	Nationwide Permits for Arizona	Section 404 Nationwide Permit Preconstruction Notification is needed if activity does not meet the conditions of a respective NWP, the specific NWP requires a PCN, or necessary per the General Conditions.	No agency review fee.	Impacts to Waters of the U.S. will require compliance with a Section 404 permit and potential authorization from the Corps.	<ul style="list-style-type: none"> The City should review the Corps' Special Public Notice Nationwide Permits for Arizona to evaluate the appropriate Section 404 permit for improvements within potential waters of the U.S. and to determine if authorization from the Corps is necessary. If necessary, the City should prepare and submit a Section 404 permit application to the Corps to authorize improvements within potential waters of the U.S. 	Nationwide Permits for Arizona: http://www.spl.usace.army.mil/Portals/17/docs/regulatory/Permit_Process/SPN_AZ_NWP(withAppendix).pdf
			Section 404 Individual Permit	6 to 9 Months	CFR 40 Part 230 Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material	<ul style="list-style-type: none"> Section 404 Individual Permit is needed if activity 1) is not covered under the NWP Program 2) does not meet the conditions of a respective NWP 3) exceeds the NWP thresholds. Inclusion of the Environmental Assessment and Statement of Findings would be necessary. 	No agency review fee			Los Angeles District US Army Corps of Engineers: http://www.spl.usace.army.mil/Missions/Regulatory.aspx
			Compensatory Mitigation	4 to 6 Months	<i>Regional Compensatory Mitigation and Monitoring Guidelines for US Army Corps of Engineers South Pacific Division</i>	Compensatory mitigation is required to offset impacts to Waters of the U.S. as a result of dredge and fill activities.	<p>Mitigation Banks: Cost of credits is set by the bank sponsor.</p> <p>In-lieu fees: \$80,000 per acre at a ratio of 1:1 to 3:1 (Arlington Wildlife Area).</p> <p>Permittee Responsible Mitigation: Dependent upon site conditions and extent of mitigation required.</p>	The requirement for the need and type of compensatory mitigation will be determined by the need for a Section 404 permit and coordination with the Corps.	<ul style="list-style-type: none"> Coordination with the Corps should occur during the Section 404 permit process to determine the appropriate form of compensatory and the associated requirements, if necessary. 	<i>Regional Compensatory Mitigation and Monitoring Guidelines for US Army Corps of Engineers South Pacific Division:</i> http://www.spd.usace.army.mil/Portals/13/docs/regulatory/mitigation/MitMon.pdf <i>Regulatory Guidance Letter08-03, Minimum Monitoring Requirements for Compensatory Mitigation Projects</i> http://www.usace.army.mil/Portals/2/docs/civilworks/RGLS/r gl08_03.pdf

Table 1. Summary of Potential Reata Wash Study Obligations and Recommendations
 Reata Wash Flood Control Improvement Study

August 2016

Regulation	Agency	Resource	Clearance Type/Project Requirement	Review/ Approval Time	Relevant Guidance Document	Requirements	Agency Fee	Study Applicability	Study Recommendations	Website Reference
Endangered Species Act	U.S. Fish & Wildlife Service	Biological Resources	Section 7 Consultation	<ul style="list-style-type: none"> • Within 30 days for Informal Consultation • Up to 135 days for Formal Consultation 	Endangered Species Consultation Handbook	<ul style="list-style-type: none"> • ESA Section 7 consultation with the USFWS is necessary if a proposed activity is likely to jeopardize the continued existence of a listed threatened or endangered species, or adversely modify or destroy critical habitat. • ESA Section 7 consultation is also necessary to support other environmental compliance processes, including those related to Section 404 and NEPA. 	No agency review fee.	<ul style="list-style-type: none"> • It is not anticipated that listed threatened or endangered species or critical habitat is located within the Reata Wash Study Area. • The Reata Wash Study Area contains habitat associated with the Sonoran desert tortoise. 	<ul style="list-style-type: none"> • The AGFD's <i>Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects</i> should be followed to ensure safe handling in the event that a Sonoran desert tortoise is encountered during construction. • The City should review the <i>AGFD Guidelines for Culvert Construction to Accommodate Fish & Wildlife Movement and Passage</i> to assist in the design, planning, and placement of culverts or bridge structures to minimize impacts to wildlife passage and movement. 	USFWS Arizona Ecological Services: http://www.fws.gov/southwest/es/arizona/ Information for Planning and Conservation: http://ecos.fws.gov/ipac/

Table 1. Summary of Potential Reata Wash Study Obligations and Recommendations
Reata Wash Flood Control Improvement Study

August 2016

Regulation	Agency	Resource	Clearance Type/Project Requirement	Review/ Approval Time	Relevant Guidance Document	Requirements	Agency Fee	Study Applicability	Study Recommendations	Website Reference
Endangered Species Act (Continued)	Federal Emergency Management Agency	Biological Resources	Endangered Species Act	30 days	<i>Guidance for Compliance with the Endangered Species Act for Letters of Map Change Procedure Memorandum 64- Compliance with the Endangered Species Act (ESA) for Letters of Map</i>	CLOMR and CLOMR-F applicants are responsible for demonstrating to FEMA that ESA compliance has been achieved prior to FEMA's review of a CLOMR or CLOMR-F application.	<ul style="list-style-type: none"> Report preparation and coordination efforts consistent with overall biological resources efforts. Reporting completed and USFWS concurrence received as part of overall Reata Wash Study can be utilized. 	FEMA coordination and floodplain revisions requests to be completed in the Reata Wash Study Area will require the preparation of biological resource documentation and consultation with the USFWS to support a CLOMR/CLOMR-F process.	<ul style="list-style-type: none"> The City should review FEMA's <i>Procedure Memorandum 64- Compliance with the Endangered Species Act (ESA) for Letters of Map Change</i> and their <i>Overview Endangered Species Act Compliance for Conditional Letters of Map Change</i> if a CLOMR or CLOMR-F is requested for the Reata Wash Study Area. 	<p><i>Compliance with the Endangered Species Act for Letters of Map Change:</i> http://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/compliance-endangered-species-act-letters-map</p> <p>Regional Environmental Officer FEMA R IX-U.S. Department of Homeland Security 1111 Broadway, Suite 1200 Oakland, California 94607-4052 Phone: 510-627-7284</p>
National Historic Preservation Act	Arizona State Historic Preservation Office	Historic Properties	Section 106 Consultation	Agency concurrence of cultural resource report typically completed within 30 to 45 days.	Protection of Historic Resources (36 CFR Part 800)	Section 106 of the NHPA, as amended, requires all federal agencies to consider the effects of their undertakings on historic properties. The regulation requires consultation with the State Historic Preservation Office (SHPO) as well as with tribal communities and other interested parties.	No agency review fee.	<ul style="list-style-type: none"> A Class I inventory indicates that seventeen sites have been recorded within the Reata Wash Study Area; of these, four have been determined eligible for nomination to the NRHP by SHPO. 	<ul style="list-style-type: none"> Should the Reata Wash Study be approved as a project, the location of potential improvements should be reviewed with respect to the results of the Class I research to determine the need for additional survey and reporting. 	<p>State Historic Preservation Office: http://azstateparks.com/SHPO/index.html</p> <p>Advisory Council on Historic Preservation: http://www.achp.gov/106summary.html</p>

APPENDIX B

Arizona Game and Fish Department Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects

GUIDELINES FOR HANDLING SONORAN DESERT TORTOISES ENCOUNTERED ON DEVELOPMENT PROJECTS

Arizona Game and Fish Department
Revised September 22, 2014

The Arizona Game and Fish Department (Department) has developed the following guidelines to reduce potential impacts to desert tortoises, and to promote the continued existence of tortoises throughout the state. These guidelines apply to short-term and/or small-scale projects, depending on the number of affected tortoises and specific type of project.

The Sonoran desert tortoise occurs south and east of the Colorado River. Tortoises encountered in the open should be moved out of harm's way to adjacent appropriate habitat. If an occupied burrow is determined to be in jeopardy of destruction, the tortoise should be relocated to the nearest appropriate alternate burrow or other appropriate shelter, as determined by a qualified biologist. Tortoises should be moved less than 48 hours in advance of the habitat disturbance so they do not return to the area in the interim. Tortoises should be moved quickly, kept in an upright position parallel to the ground at all times, and placed in the shade. Separate disposable gloves should be worn for each tortoise handled to avoid potential transfer of disease between tortoises. Tortoises must not be moved if the ambient air temperature exceeds 40° Celsius (105° Fahrenheit) unless an alternate burrow is available or the tortoise is in imminent danger.

A tortoise may be moved up to one-half mile, but no further than necessary from its original location. If a release site or alternate burrow is unavailable within this distance, and ambient air temperature exceeds 40° Celsius (105° Fahrenheit), contact the Department for guidance. Tortoises salvaged from projects which result in substantial permanent habitat loss (e.g. housing and highway projects), or those requiring removal during long-term (longer than one week) construction projects, may be placed in the Department's tortoise adoption program. *Managers of projects likely to affect desert tortoises should obtain a [scientific collecting license](#) from the Department to facilitate handling or temporary possession of tortoises.* Likewise, if large numbers of tortoises (>5) are expected to be displaced by a project, the project manager should contact the Department for guidance and/or assistance.

Please keep in mind the following points:

- Use the Department's [Environmental On-Line Review Tool Department](#) during the planning stages of any project that may affect desert tortoise habitat.
- Unless specifically authorized by the Department, or as noted above, project personnel should avoid disturbing any tortoise.
- Take is prohibited by state law.
- These guidelines do not apply to Mojave desert tortoises (north and west of the Colorado River). Mojave desert tortoises are listed as threatened under the Endangered Species Act, administered by the U.S. Fish and Wildlife Service.
- These guidelines are subject to revision at the discretion of the Department.

APPENDIX C

**Class I cultural resource inventory “A Class I Cultural Resources Inventory for the
Reata Wash Flood Control Improvement Study, Scottsdale, Maricopa
County, Arizona”**

A Class I Cultural Resources Inventory for the Reata Wash Flood Control Improvement Study, Scottsdale, Maricopa County, Arizona

Prepared for:

City of Scottsdale

On behalf of:

Wood, Patel & Associates

Prepared by:

Justin P. Rego, M.A., RPA



L O G A N S I M P S O N

Logan Simpson
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July 2016 (Submittal 1)

Logan Simpson Technical Report No. 145219

ABSTRACT AND MANAGEMENT SUMMARY

Report Title	A Class I Cultural Resources Inventory for the Reata Wash Flood Control Improvement Study, Scottsdale, Maricopa County, Arizona		
Report Date	July 2016		
Logan Simpson Project Name	Reata Wash Flood Control Improvement Study		
Agency Nos.	To be determined.		
Agencies Involved	City of Scottsdale (COS), Arizona State Land Department (ASLD), US Army Corps of Engineers (USACE), US Bureau of Reclamation (Reclamation), US Fish and Wildlife Service (USFWS), Federal Emergency Management Agency (FEMA), and Flood Control District of Maricopa County (FCDMC)		
Land Ownership	ASLD, Reclamation, Bureau of Land Management (BLM), and private land.		
Funding	COS		
Logan Simpson Project No.	145219		
Project Description	The City of Scottsdale Reata Wash Flood Control Improvement Study (Reata Wash Study) is completing an evaluation of the Reata Wash floodplain to identify and recommend flood control measures to reduce flood risks to residents, property and public infrastructure. The Reata Wash Study Area encompasses 5,814 acres between the alluvial fan apex just south of Pinnacle Peak Road and the CAP canal. The City of Scottsdale has requested that Logan Simpson prepare a Class I cultural resources inventory to assess the level of previous cultural resources survey and to identify known cultural resources sites within the Reata Wash Study Area and the surrounding one-mile wide buffer. The Reata Wash Study Area and one-mile buffer for the Class I inventory encompasses 17,978 acres within an area bounded by Jomax Road to the north, N. 64th Street to the west, E. Cactus Road to the south, and the McDowell Mountains to the east.		
Project Location	Within portions of Sections 24–26, 35, and 36 of T4N, R4E; Sections 8, 17–20, 29–32 of T4N, R5E; Sections 1 and 2 of T3N, R4E; and Sections 5, 6, and 8 of T3N, R5E; Gila and Salt River Baseline and Meridian (G&SRB&M) [USGS 7.5' Quadrangles, Curry's Corner, Ariz. (1964, 1984); McDowell Peak, Ariz. (1965, 1982)].		
Methods	Records search/site files check and literature review		
Number of Previously Recorded Sites	Total: 42 sites		
Sites Determined NRHP Eligible	Total: 5		
	AZ U:5:37(ASM)	AZ U:5:149(ASM)	AZ U:5:150(ASM)
	AZ U:5:151(ASM)	AZ U:5:152(ASM)	
Sites Determined NRHP Ineligible	Total: 6		
	AZ T:8:65(ASM)	AZ U:5:30(ASM)	AZ U:5:99(ASM)
	AZ U:5:100(ASM)	AZ U:5:101(ASM)	AZ U:5:142(ASM)

Sites Recommended NRHP Eligible	Total: 8		
	AZ U:5:69(ASU)	AZ U:5:80(ASU)	AZ U:5:156(ASM)
	AZ U:5:159(ASM)	AZ U:5:161(ASM)	AZ U:5:162(ASM)
	AZ U:5:266(ASM)	AZ U:5:278(ASM)	
Sites Recommended NRHP Ineligible	Total: 5		
	AZ U:5:141(ASM)	AZ U:5:245(ASM)	AZ U:5:273(ASM)
	AZ U:5:274(ASM)	AZ U:5:275(ASM)	
Sites Not Evaluated For NRHP Eligibility	Total: 18		
	AZ U:5:11(ASM)	AZ U:5:13(ASM)	AZ U:5:14(ASM)
	AZ U:5:28(ASM)	AZ U:5:64(ASU)	AZ U:5:102(ASM)
	AZ U:5:153(ASM)	AZ U:5:154(ASM)	AZ U:5:157(ASM)
	AZ U:5:158(ASM)	AZ U:5:160(ASM)	AZ U:5:163(ASM)
	AZ U:5:224(ASM)	AZ U:5:239(ASM)	AZ U:5:8(REC)
	IHCRS90-10	AZ U:5:352(ASM)	#4 ARS

Summary and Recommendations

Logan Simpson's research indicates that approximately 78 percent of the cultural resources Reata Wash Study Area and the surrounding one-mile buffer, has been previously surveyed for cultural resources. Approximately 71 percent of the Reata Wash Study Area has been previously surveyed. In all, 42 sites have been previously recorded in the Reata Wash Study Area and one-mile buffer, including five sites determined eligible for inclusion in the National Register of Historic Places (NRHP) by the State Historic Preservation Office (SHPO). Seventeen sites have been recorded within the Reata Wash Study Area; of these, four have been determined eligible for nomination to the NRHP by SHPO.

Logan Simpson recommends that a new survey be conducted in portions of the Reata Wash Study Area where previously conducted surveys do not meet current standards. A pedestrian survey should also be conducted for unsurveyed portions of the Reata Wash Study Area. Seven of the 17 sites within the Reata Wash Study Area were recorded before April 1994, and should be reevaluated for their NRHP-eligibility as they were recorded under an outdated site definition. Ten sites have been recorded using the current site definition. These sites should be re-visited to document their current condition.

Upon the completion of a Class III survey and site relocation and recordation, recommendations should be made for the treatment, preservation, or avoidance of sites, as appropriate. Based on current research, it is known that five NRHP-eligible sites are located within the Reata Wash Study Area and buffer. Of these, four are within the Reata Wash Study Area. If federal funds are involved, and it is subsequently determined that one or more NRHP-eligible cultural resources cannot be avoided by project activities, a Memorandum of Agreement or Programmatic Agreement should be developed to resolve the adverse effect of the project to historic properties.

TABLE OF CONTENTS

Abstract and Management Summary	i
Introduction	1
Physical Setting	1
Culture History	7
Research Methods and Results	12
Previous Class III Cultural Resources Surveys	12
GLO Maps	19
Previous Class III Cultural Resources Sites	19
National Register of Historic Places and Scottsdale Historic Register-Listed Resources	25
Summary and Recommendations	26
References	32

LIST OF TABLES

Table 1. Reata Wash Study Area legal description	1
Table 2. Previous research in the study area and buffer for the Reata Wash Flood Control Improvement Study	12
Table 3. Historic GLO maps and identified features within the Reata Wash Study Area and Reata Wash Study Area buffer	19
Table 4. Previously recorded sites in the study area buffer for the Reata Wash Flood Control Improvement Study	20
Table 5. Survey Recommendation Summary for the Reata Wash Flood Control Improvement Study	28
Table B.1. Study area and study area buffer Site Summary for the Reata Wash Flood Control Improvement Study	55

LIST OF FIGURES

Figure 1. Reata Wash Study Area location	3
Figure 2. Land jurisdiction and Reata Wash Study Area buffer limits	4
Figure 3. Land jurisdiction and Reata Wash Study Area buffer limits	5
Figure 4. Land jurisdiction and Reata Wash Study Area buffer limits	6
Figure 5. Previously conducted projects in the Reata Wash Study Area buffer limits	16
Figure 6. Previously conducted projects in the Reata Wash Study Area buffer limits	17
Figure 7. Previously conducted projects in the Reata Wash Study Area buffer limits	18
Figure 8. General Land Office features in the Reata Wash Study Area buffer limits	22
Figure 9. General Land Office features in the Reata Wash Study Area buffer limits	23
Figure 10. General Land Office features in the Reata Wash Study Area and Reata Wash Study Area buffer limits	24
Figure 11. Areas within the Reata Wash Study Area recommended for new survey	30
Figure 12. Areas within the Reata Wash Study Area recommended for new survey	31
Figure A. 1. Previous sites within the Reata Wash Flood Control Improvement Study Area and 1-mile Buffer	51
Figure A. 2. Previous sites within the Reata Wash Flood Control Improvement Reata Wash Study Area and 1-mile Buffer	52
Figure A. 3. Previous sites within the Reata Wash Flood Control Improvement Study Area and 1-mile Buffer	53

INTRODUCTION

The City of Scottsdale Reata Wash Flood Control Improvement Study (Reata Wash Study) is completing an evaluation of the Reata Wash floodplain to identify and recommend flood control measures to reduce flood risks to residents, property and public infrastructure. The City of Scottsdale has requested that Logan Simpson prepare a Class I cultural resources inventory to assess the level of previous cultural resources survey and to identify known cultural resources sites within the Reata Wash Study Area and the surrounding one-mile wide buffer. The Reata Wash Study Area encompasses 5,814 acres between the alluvial fan apex just south of Pinnacle Peak Road and the CAP canal. The 1-mile Reata Wash Study Area buffer for the Class I inventory encompasses 17,978 acres within an area bounded by Jomax Road to the north, N. 64th Street to the west, E. Cactus Road to the south, and the McDowell Mountains to the east (Figures 2-4). The Reata Wash Study Area encompasses portions of Sections 24–26, 35, and 36 of T4N, R4E; Sections 8, 17–20, 29–32 of T4N, R5E; Sections 1 and 2 of T3N, R4E; and Sections 5, 6, and 8 of T3N, R5E; Gila and Salt River Baseline and Meridian (G&SRB&M) (Table 1; Figure 2-4). The Reata Wash Flood Control Improvement Reata Wash Study Area buffer encompasses State Trust land under the administration of the Arizona State Land Department (ASLD), federal land under the jurisdiction of the Bureau of Reclamation (Reclamation) and Bureau of Land Management (BLM), and private land.

Table 1. Reata Wash Study Area legal description.

Location ¹	Map reference
T4N, R4E, Secs. 24, 25, 26, 35, 36	Curry's Corner, Ariz. (1964, 1982)
T4N, R5E, Secs. 18, 19, 30, 31	Curry's Corner, Ariz. (1964, 1982)
T3N, R5E, Sec. 6	Curry's Corner, Ariz. (1964, 1982)
T3N, R4E, Secs. 1, 2	Curry's Corner, Ariz. (1964, 1982)
T4N, R5E, Secs. 8, 17, 20, 29, 32	McDowell Peak, Ariz. (1965, 1982)
T3N, R5E, Sec. 5	McDowell Peak, Ariz. (1965, 1982)

¹G&SRB&M

PHYSICAL SETTING

The Reata Wash Study Area buffer is situated at an average elevation of 1,900 ft above mean sea level and is located in the Basin and Range physiographic province, which is characterized by low desert surrounded by fault-block mountain ranges (Chronic 1983). Within this region, the Reata Wash Study Area buffer traverses two subdivisions of the Sonoran Desertscrub biotic community; the Lower Colorado River Valley subdivision, and the Arizona Uplands subdivision (Turner and Brown 1994). The Sonoran Desertscrub biotic community is characterized by high temperatures and low precipitation. Prior to Euro-American settlement and development of the region, the native vegetation communities were probably dominated by bursage and creosotebush with a mix of saguaro, prickly pear, cholla cactus, saltbush, grasses, ocotillo, and palo verde. The largest drainage in the vicinity is the Salt River, located approximately 10 miles to the southeast of the Reata Wash Study Area. Topographic features adjacent to the Reata Wash Study Area buffer include McDowell Mountains to the east. The local geology consists of Early Pleistocene to Late Miocene basin deposits, composed of poorly sorted, variably consolidated gravel

and sand. A review of aerial imagery indicates that the Reata Wash Study Area buffer has largely been developed, and is characterized by residential communities and businesses.

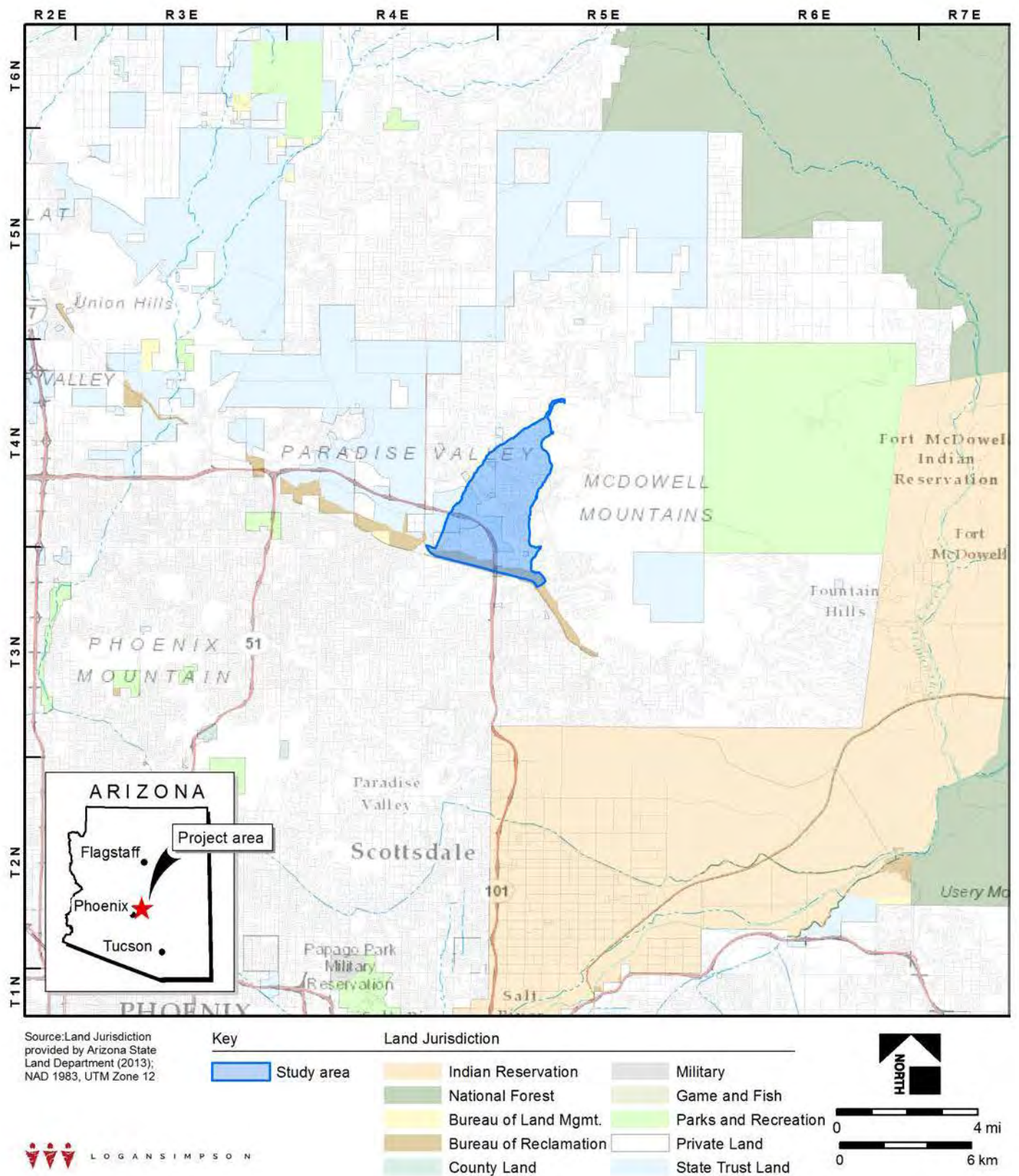


Figure 1. Reata Wash Study Area location.

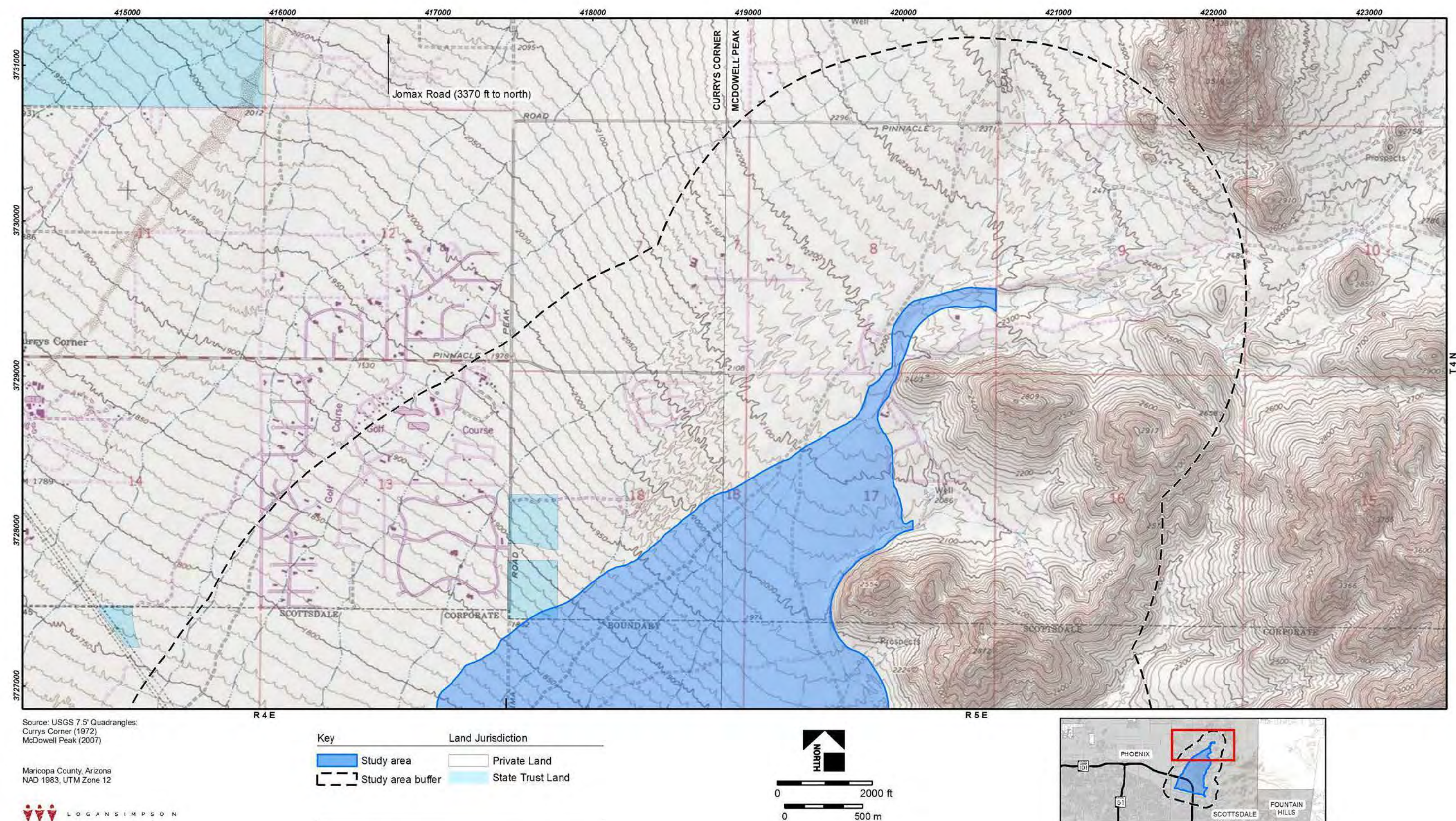


Figure 2. Land jurisdiction and Reata Wash Study Area buffer limits

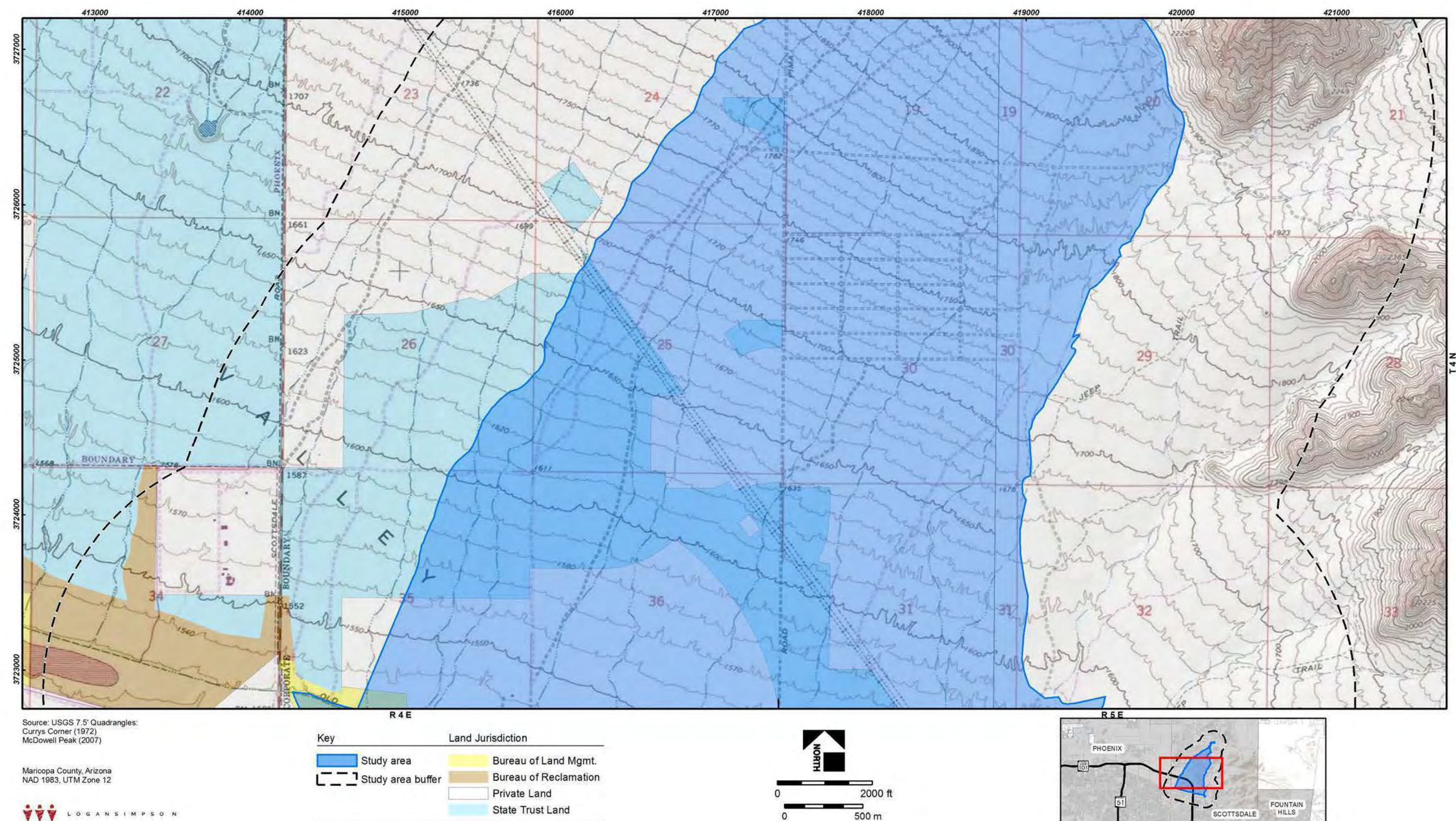


Figure 3. Land jurisdiction and Reata Wash Study Area buffer limits

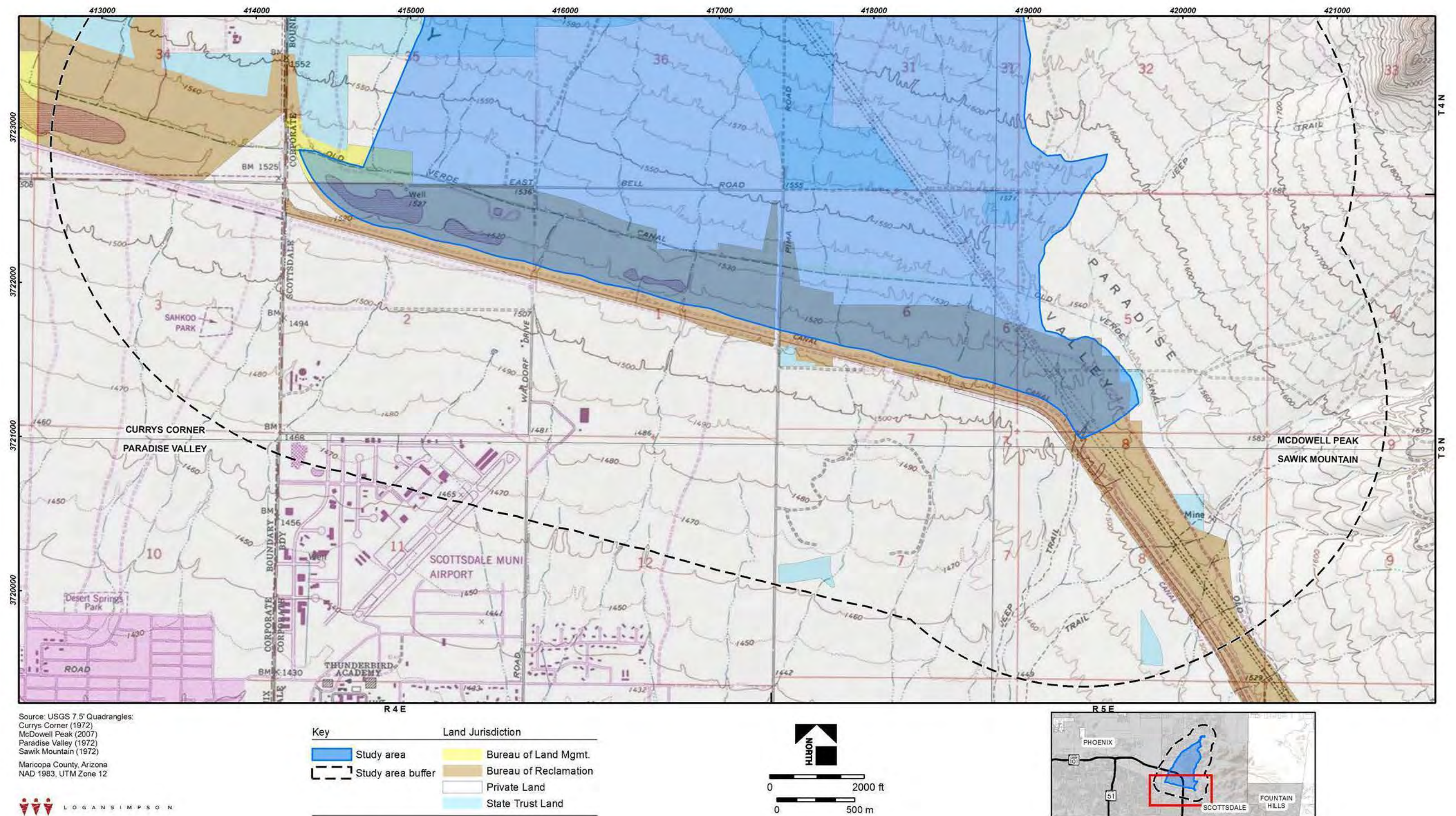


Figure 4. Land jurisdiction and Reata Wash Study Area buffer limits

CULTURE HISTORY

Human presence in the Southwest began as long as 11,000 years ago (Table 1). The initial period of occupation, during the Paleoindian period dating from approximately 10,000 B.C. to 8500 B.C., appears to have been intermittent, given the limited amount of recovered evidence. The evidence consists primarily of isolated surface finds of Clovis points, as well as buried megafaunal kill sites in alluvial contexts that have yielded associated lithic assemblages (Haynes 1980, 2011). Based on these scant data, the period appears to be characterized by dispersed mobile groups that primarily hunted now-extinct megafauna and possibly supplemented their diet with collected wild plant materials (Waters 1986). Although until recently only a few artifactual surface finds have been reported in the general region (Agenbroad 1967; Huckell 1982), it is likely that most Paleoindian period remains are currently buried by substantial Holocene alluvial deposits. Three isolated points have been found in the northern periphery of the Phoenix Basin (Crownover 1994; Huckell 1982; North, Lindly, and Schmidt 2004; North et al. 2005), representing the only known evidence, to date, of Paleoindian occupation or use of the Phoenix Basin.

Following climatic amelioration and the extinction of the previously exploited fauna, a new cultural pattern emerged, the Southwestern Archaic, manifested by small, mobile, residential groups that hunted medium- and small-size game and foraged for a diversity of floral resources. This adaptive pattern persisted through the Early (8500 B.C. to 5000 B.C.) and Middle (5000 B.C. to 2000 B.C.) Archaic periods, although there was a trend toward an increased reliance on migratory patterns based on seasonally available foodstuffs, as evidenced by the increased prevalence of grinding tools in the artifact assemblage. By the Early Agricultural period (2000 B.C. to A.D. 50), groups occupying well-watered upland locations or locales along primary or secondary stream courses adopted maize horticulture, regularly constructed small-scale canal irrigation systems, maintained substantial storage facilities, and established a semi-sedentary subsistence-settlement pattern (Huckell 1995; Mabry 1998, 2000). Around 500 B.C. large, seasonally occupied villages, some with communal structures, were established in southern Arizona (Mabry 1998). These villages focused around floodplains where maize agriculture and riparian resources were available, but also continued the exploitation of upland bajada resources. In non-riverine desert areas, however, the tradition of hunting and foraging appears to have persisted at least through the end of the Archaic period (Halbirt and Henderson 1993).

Early Agricultural semi-sedentary settlements, such as those identified in upland and riverine areas to the south in the Tucson Basin and parts of southeastern Arizona (Huckell 1995; Mabry 1998; Roth 1992), have only recently been identified in the Phoenix Basin. Other settlements may be situated in floodplains or along river terraces and, if preserved, may be deeply buried in alluvium.

The succeeding Early Formative period (Early Ceramic period), dating between A.D. 50 and approximately A.D. 450, is characterized primarily by the introduction and development of plainware ceramics and the bow and arrow. This period can be considered a period of transition, during which sedentism and the reliance on horticulture increased throughout the general region. In specific

Table 1. Phoenix Basin Phase Sequence.

PERIOD		PHASE
A.D. 1900— A.D. 1800— A.D. 1700— A.D. 1600— A.D. 1500—	HISTORIC	
A.D. 1400— A.D. 1300— A.D. 1200— A.D. 1100— A.D. 1000—	PROTOHISTORIC	
A.D. 1400— A.D. 1300— A.D. 1200—	CLASSIC	Polvorón A.D. 1450 Civano Soho A.D. 1300
A.D. 1100— A.D. 1000—		Sacaton A.D. 1150
A.D. 900— A.D. 800— A.D. 700—		Santa Cruz A.D. 900 Gila Butte A.D. 800
A.D. 600— A.D. 500— A.D. 400— A.D. 300— A.D. 200— A.D. 100—	PIONEER	Snaketown A.D. 700 Estrella/Sweetwater Vahki
100 B.C.— 500 B.C.— 1000 B.C.—		Red Mountain A.D. 450
2000 B.C.— 3000 B.C.— 5000 B.C.— 7000 B.C.— 9000 B.C.— 10,000 B.C.—		?
1000 B.C.— 500 B.C.— 100 B.C.—	EARLY AGRICULTURAL	
1000 B.C.— 500 B.C.— 100 B.C.—		
1000 B.C.— 500 B.C.— 100 B.C.—		
1000 B.C.— 500 B.C.— 100 B.C.—	ARCHAIC	2000 B.C.
1000 B.C.— 500 B.C.— 100 B.C.—		5000 B.C.
1000 B.C.— 500 B.C.— 100 B.C.—		8500 B.C.
1000 B.C.— 500 B.C.— 100 B.C.—	PALEOINDIAN	10,000 B.C.

areas, such as the Tucson Basin where both Late Archaic and Early Formative villages have been recorded, settlement location reflects a general continuity from the earlier villages. Current understanding of the initial phase of the Early Formative period in the Salt River area, the Red Mountain phase (A.D. 50 to 450), however, is limited to data derived from a few sites and site components in the Phoenix Basin (Mabry 2000). The Red Mountain phase is represented by the earliest component at Pueblo Patricio, which is composed of small semi-sedentary farmsteads (Cable and Doyel 1987; Hackbarth 2010; Henderson 1995), La Escuela Cuba (Hackbarth 1992), the Red Mountain site (Morris 1969), and limited activity sites (Brown and Crespin 2009; Kenny 1987; Hackbarth 1998; Phillips et al. 2001, Rogge 2009). The mortuary pattern is characterized principally by flexed inhumations, although secondary cremations have also been documented (Mabry 2000).

The Vahki, Estrella, Sweetwater, and Snaketown phases traditionally make up the Pioneer period in Hohokam cultural chronology (Gladwin et al. 1937; Haury 1976). The Pioneer period has undergone some recent reevaluation regarding the origins and development of the Hohokam (Dean 1991; Wallace et al. 1995). The placement of these phases (A.D. 450 to 700) is based on the available limited excavation and artifact data and can best be characterized as a continuation of the broad regional Early Formative-period cultural development, with the beginnings of a cultural pattern that was developing in the Phoenix Basin.

During the Vahki phase, micaceous plainware along with redware ceramics were produced and a figurine complex developed. Other characteristics of this phase include settlements with plaza-oriented layouts, the construction of large Type P-3 and P-4 houses that were first identified at Snaketown (Gladwin et al. 1937; Haury 1976:68; Wilcox et al. 1981), and a mortuary pattern that incorporated both pit and trench cremations and flexed and semi-flexed inhumations (Doyel 1991). The following Estrella and Sweetwater phases are characterized primarily by the production of grooved and decorated red-on-gray ceramics. Although the square P-3 and P-4 houses continued to be constructed, they were smaller in size than those of the Vahki phase and co-occurred with the smaller structures (Hackbarth 2011; Henderson 1989, 1995). The presence of some intrusive elements, including evidence of macaws and parrots, shell, and turquoise at principal settlements such as Snaketown, suggests the development of regional interaction patterns.

The emergence of the Hohokam as an integrated cultural pattern occurred possibly as early as A.D. 700 during the Snaketown phase, although a much earlier origin beginning in the Vahki phase originally had been proposed (Gladwin et al. 1937). Recent assessments have suggested that the suite of cultural traits and developments that marked the beginnings of regional cultural differentiation and that characterized the Hohokam does not appear to be fully established until the Snaketown phase or possibly as late as the middle of the Gila Butte phase of the Colonial period, beginning around A.D. 750 (Dean 1991; Doyel 1991; Wallace et al. 1995; Wilcox 1979; Wilcox and Sternberg 1983). These traits, which reflect the development of an integrated belief and ritual system and the inception of a regional system, include the adoption of public architectural forms, such as ballcourts, into the settlement structure and the development of a characteristic mortuary complex, large-scale irrigation agriculture, and naturalistic iconography in decorated ceramics.

Throughout the pre-Classic period, between A.D. 700 and approximately A.D. 1150, the Phoenix Basin can be considered the primary focus of Hohokam regional development. During the Snaketown phase of the Pioneer period, the emerging Hohokam cultural pattern was manifested by the first documented construction of canals (Wilcox and Shenk 1977) and urn burials (Haury 1976). Trash mounds appeared during this period, and one at Snaketown was capped with caliche, possibly a precursor to the later platform mounds (Haury 1976). Evidence of Hohokam occupation or interaction is first identified outside the Phoenix Basin in locations such as the lower Verde River and in the Tucson Basin (Crown 1991).

The establishment of numerous villages throughout the region, including peripheral areas along secondary drainages where canal irrigation was not feasible, characterizes the Colonial period. Habitation sites consisting of courtyard groups focused on a common living or workspace represented a frequent pattern of settlement organization during this period (Howard 1985; Wilcox et al. 1981). At smaller hamlets and villages consisting of one or two courtyard groups, trash mounds, cemetery areas, and roasting pits tended to be arrayed around the margins of the courtyard. At larger villages composed of clusters of courtyard groups, central plazas and communal cemeteries and work areas were probably incorporated into the village structural layout (Howard 1985; Wilcox and Sternberg 1983). The introduction of ballcourts at some of these villages, at least by the Gila Butte phase, suggests the beginnings of site functional differentiation and intercommunity integration. Ballcourts, as a widespread form of public architecture, increased in number and expanded in areal extent throughout the Colonial period. By the Sedentary period, ballcourts were represented not only in the Phoenix Basin but in surrounding areas as well.

The Santa Cruz phase of the Colonial period and the Sacaton phase of the Sedentary period were times of substantial growth in the number and size of Hohokam settlements and ballcourt villages and in the extent of the canal networks in the Phoenix Basin (Doyel 1991). In peripheral drainage areas, the number of villages, hamlets, and farmsteads also increased. Non-irrigation agricultural intensification and the intensive use of agricultural rock piles for the cultivation of crops, such as agave and cholla, appear to have developed at least by the late Sedentary or early Classic periods (Fish et al. 1992; Masse 1991).

By the beginning of the early Classic period, change in the structure of Hohokam communities is evidenced by a shift in burial practices from primarily cremations to inhumations, a change in regional exchange networks as reflected by the shift in the production and distribution of ceramic types and exotic materials, and the development of new domestic and public architectural forms, including post-reinforced and adobe-walled structures and walled compounds. The decline and eventual collapse of the ballcourt system and the development of the platform mound also occurred during this period (Gregory 1987). The platform mound architectural form, developed during the late Sedentary period, represented an important architectural component of a new community organization that was manifested in Hohokam settlements not only in the Phoenix Basin but also in other settlements over a much wider region, including the Tonto and Tucson basins and along the lower San Pedro River. The platform mound apparently evolved in function from an initial nonresidential, special-purpose facility to a residence used by a specific residential group (Gregory 1991). More recent study of the Pueblo Grande platform mound directly challenges the idea that the Civano-phase mounds were the full-time residences of elite households and further supports the proposition that power was diffuse at that time (see Downum and Bostwick 2003).

In conjunction with this Classic-period community restructuring, a hierarchy of settlement types also emerged. These included villages with only one or a few walled residential compounds; villages with one or more platform mound compounds as well as other compounds; and large settlements, such as Casa Grande, with a platform mound and numerous compounds, a ballcourt, and a Great House (Wilcox 1991). These various Classic-period settlements may have composed distinct irrigation communities: sociopolitical organizations consisting of a number of integrated villages that included one or more platform mound villages serving as administrative centers and distributed along a single canal or canal system (Howard 1987). One view of the terminal period of prehistoric occupation in the Phoenix Basin is the tentatively defined and dated Polvorón phase (Doyel 1995; Sires 1983). As originally defined, occupation during the Polvorón phase is represented by dispersed ranchería settlements, consisting of individual pit structures or jacal rooms arranged in clusters. In some cases, however, late Classic-period compounds were reoccupied (Crown and Sires 1984; Doyel 1995; Sires 1983). This perspective treats the phase as a period of abrupt change in community organization and integration in the aftermath of the collapse of the late Classic-period platform mound communities. The end of the Hohokam is explained as following a period of drought and flood conditions that substantially reduced or destroyed the irrigation systems on which these communities relied (Doyel 1995; Nials et al. 1989). However, researchers continue to debate whether the phase is valid. For example, Henderson and Hackbarth (2000), on the basis of overlapping dates between the Civano and Polvorón phases, argue that the characteristics of the latter are not temporally discrete but rather a reflection of cultural variability within the Classic period. Alternatively, Chenault (2000:277) argues "... that not to separate Polvorón from the Civano phase obscures variability and change at the end of the cultural sequence that may relate to the nature and causes of the Hohokam collapse." Hill and colleagues (2004), on the other hand, take a broader perspective of regional Hohokam settlement change and suggest that population decline over multiple generations was intertwined with immigration and community coalescence.

Historic Period

By the time of Spanish contact in the mid- to late sixteenth century, the Pima and Maricopa occupied the middle portion of the Gila River. The Pima have been traditionally considered the descendants of the Hohokam in the Phoenix Basin (Doyel 1991; Haury 1976), although the validity of this particular prehistoric-historic connection has been debated (Doelle 1981; Masse 1991). The mountainous areas north and west of the Salt River were largely occupied by the Yavapai. Gifford (1932, 1936) considered the Yavapai most closely aligned in terms of cultural traits with the upland Yuman, Walapai and Havasupai of northwestern Arizona.

Euro-American incursion into the area occurred after 1846 as a result of the Mexican-American War and its aftermath, with incursions of the military, explorers, surveyors, immigrants, and finally settlers. The war ended in 1848 with the signing of the Treaty of Guadalupe Hidalgo. The American era (A.D. 1853–1950) began with the Gadsden Purchase of 1853, when modern-day southern Arizona became part of the United States. The late 1800s saw an influx of settlement into the Salt River Valley, encouraged by a series of national public land laws, such as the National Homestead Act (1862), Timber Culture Act (1873), Desert Land Act (1877), and Enlarged Homestead Act (1909). The majority of homesteads filed in Arizona during this period were along the Salt River (Stein 1990). By the 1870s, many settlers in the area were extensively

cultivating land (Arizona Board of Regents 1989). President Roosevelt signed the Reclamation Act of 1902, creating the first national effort to build large-scale irrigation projects in the western United States. Two dams along the Salt River (Granite Reef and Roosevelt) and an extensive canal network in the Phoenix Basin became our nation's flagship reclamation project. The irrigation and electricity provided by this, the Salt River Project, was instrumental in the development of Phoenix during the twentieth century (Zarbin 1986, 1997).

RESEARCH METHODS AND RESULTS

A Class I inventory, consisting of a literature review and site records search, was undertaken to assess the status of previous surveys and to identify known cultural resources and archaeological sites within the Reata Wash Study Area and a surrounding one-mile radius. Records from the Arizona State Historic Preservation Office (SHPO) and the Arizona State Museum (ASM) were accessed using AZSITE, the state's electronic inventory of cultural resources. The Scottsdale Historic Register and National Register Information System (NRIS) were accessed to collect information on historic buildings and structures and National Register of Historic Places (NRHP) listed properties potentially located within the Reata Wash Study Area and one-mile Reata Wash Study Area buffer. Additionally, available Bureau of Land Management (BLM) General Land Office (GLO) maps were accessed electronically to identify features documented historically.

PREVIOUS CLASS III CULTURAL RESOURCES SURVEYS

The results of the records search indicate that 191 projects have been previously conducted within the Reata Wash Study Area and Reata Wash Study Area buffer (Table 2; see Figures 5–7). Most of these were surveys completed for various residential and business developments and infrastructure projects including private development, cellular towers, rights-of-way, road construction, and electric utility structures.

Table 2. Previous research in the study area and buffer for the Reata Wash Flood Control Improvement Study.

Reference number	Author and year	Figure	Reference number	Author and year	Figure
1964-4.ASM	Ayres (1965)	5	1986-46.ASM	Myers (1986)	6, 7
1972-5.ASM	Kemrer et al. (1972)	7	1988-109.ASM	Ritz (1988)	7
1978-64.ASM	Brown (1978)	6, 7	1988-192.ASM	Curtis and Stone (1988)	6
1981-156.ASM	Green (1981)	7	1989-45.ASM	Macnider (1989)	6, 7
1982-36.ASM	Lange (1982)	7	1989-96.ASM	Stone (1989)	6, 7
1982-195.ASM	Foster (1982)	7	1989-208.ASM	Breternitz (1989)	5, 6
1983-130.ASM	Madsen (1983)	6	1990-94.ASM	Damron (1990)	5
1985-11.ASM	ASM (1985a)	6, 7	1990-125.ASM	Stone (1990)	6, 7
1985-30.ASM	ASM (1985b)	6	1991-129.ASM	Hackbarth (1991)	6
1985-50.ASM	Rozen (1985)	5	1993-110.ASM/ SHPO-2000-2428	Woodall (1993)	6, 7

Table 2. Previous research in the study area buffer for the Reata Wash Flood Control Improvement Study.

Reference number	Author and year	Figure	Reference number	Author and year	Figure
1994-23.ASM	Roth (1994)	7	2000-405.ASM	Aguila (2000b)	7
1994-51.ASM/ 7.3360.SHPO	Douglas (1994)	7	2000-427.ASM	Webb (2000)	6
1994-64.ASM	Schroeder (1994)	5	2000-394.ASM	DeMaagd (2000)	6, 7
1994-91.ASM	Gifford (1994a)	6, 7	2000-444.ASM	Schroeder (2000)	7
1994-230.ASM	Gifford (1994b)	6, 7	2000-507.ASM	Lindly (2000a)	6, 7
1994-437.ASM	Foster and Werner (1994)	5, 6	2000-514.ASM	Lindly (2000b)	5
1994-442.ASM	Foster (1995)	7	2000-523.ASM	Ryden and Lindly (2000)	7
1995-18.ASM/ 7.3305.SHPO	Gifford (1995)	7	2000-559.ASM	Stephen (2001)	7
1995-239.ASM/ 7.3379.SHPO	Kramer (1995)	7	2000-729.ASM	Larkin (2000)	7
1995-259.ASM	Owens (1995a)	5	2001-23.ASM	Boloyan (2001)	7
1995-297.ASM	Owens (1995b)	6, 7	2001-59.ASM	Webb (2001b)	6, 7
1996-214.ASM	DeMaagd (1996)	6	2001-61.ASM	Winter and Rogge (2001)	7
1996-348.ASM	Lincoln (1996)	7	2001-76.ASM	Lonardo (2001a)	7
1997-30.ASM	Greenaker (1997)	7	2001-77.ASM	Lonardo (2001b)	7
1997-55.ASM	Schroeder (1997)	5	2001-116.ASM	Marshall (2001a)	7
1998-109.ASM	Adams (1998)	7	2001-122.ASM	Hackbarth (2001a)	7
1998-223.ASM	Stubing (1998a)	6	2001-123.ASM	Marshall (2001b)	7
1998-225.ASM	Stubing (1998b)	7	2001-160.ASM	Frison (2001)	7
1999-64.ASM	Wenker (1999a)	5	2001-175.ASM	Lundin (2001a)	5
1999-66.ASM	Wenker (1999b)	5	2001-280.ASM	Foster and Mitchell (2001)	7
1999-128.ASM	Moreno (1999)	6	2001-303.ASM	Hackbarth (2001b)	7
1999-259.ASM	Montero (1999)	7	2001-330.ASM	Webb (2001a)	7
1999-305.ASM	Aguila (1999)	6	2001-337.ASM	Lundin (2001b)	7
1999-368.ASM	Schaafsma (1999)	7	2001-442.ASM	Hart (2001)	7
1999-381.ASM	Hurlbut (1999)	6	2001-480.ASM/ SHPO-2001-2210	Slawson (2001a)	6
2000-85.ASM	Schmidt (2000a)	7	2001-599.ASM	Lundin (2001c)	5
2000-86.ASM	Schmidt (2000b)	7	2001-640.ASM	Foster (2001)	7
2000-93.ASM	Courtright (2000a)	7	2001-687.ASM	Lundin (2001d)	5, 6
2000-122.ASM	Walsh (2000)	5	2001-691.ASM	Schmidt (2001)	7
2000-145.ASM	Courtright (2000b)	5	2001-707.ASM	Lundin (2001e)	7
2000-205.ASM	Aguila (2000a)	6, 7	2001-730.ASM	Webb (2001c)	7
2000-235.ASM	Courtright (2000c)	7	2001-732.ASM/ SHPO-2002-947	Webb (2001d)	7

2000-260.ASM	Kober (2000)	7	2002-26.ASM	Kober (2002)	7
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Continued

Table 2. Previous research in the study area buffer for the Reata Wash Flood Control Improvement Study.

Reference number	Author and year	Figure	Reference number	Author and year	Figure
2002-140.ASM	Coriell (2002)	7	2005-84.ASM	Mitchell and Schmidt (2004c)	7
2002-221.ASM	Hart (2002)	7	2005-262.ASM	Shaw (2002b)	7
2002-297.ASM	Robinson and Copeland (2002)	6	2005-263.ASM	Shaw (2002c)	7
2003-233.ASM	Lundin (2003)	7	2005-270.ASM	Gage (2004)	7
2003-587.ASM	Rapp (2003)	5	2005-261.ASM	Shaw (2002a)	6, 7
2003-695.ASM	Davis and Hohmann (2001)	7	2005-425.ASM	Bellavia et al. (2005)	6, 7
2003-777.ASM	Davis (2000)	7	2005-427.ASM	Bellavia and Mitchell (2005a)	7
2003-918.ASM	Hathaway (2000)	7	2005-476.ASM	Marshall (2004)	7
2003-996.ASM	Hackbarth (2003)	6	2005-746.ASM	Shaw (2002d)	7
2003-1012.ASM	Mitchell (2002)	6, 7	2005-876.ASM	Rainey (2005a)	7
2003-1098.ASM	Lonardo (2002)	7	2005-936.ASM	Marshall (2005)	7
2003-1127.ASM	Breen (2002)	7	2005-1078.ASM	Rainey (2005b)	5
2003-1134.ASM	Rapp (2002)	6, 7	2006-26.ASM	Lonardo (2006a)	7
2003-1388.ASM	Cogswell (2003)	7	2006-159.ASM	Lonardo (2006b)	7
2003-1570.ASM	Santos and Walsh (2003)	6, 7	2006-213.ASM	Stahman (2005)	7
2004-173.ASM	Hohmann and Davis (2003)	5	2006-262.ASM	Rowe (2006)	6
2004-288.ASM	Schmidt et al. (2004)	7	2006-459.ASM	Mitchell and Caldwell (2006)	7
2004-289.ASM	Schmidt and Mitchell (2004b)	7	2006-493.ASM	Wilcox (2006)	6
2004-456.ASM	Hackbarth (2004a)	7	2006-802.ASM	Bellavia and Mitchell (2005b)	5
2004-459.ASM	Hackbarth (2004b)	7	2006-835.ASM	Bellavia and Mitchell (2005c)	7
2004-485.ASM	Alter and Dobschuetz (2004)	6	2006-944.ASM	Rapp (2007)	5
2004-528.ASM	Erickson and Rogge (2004)	7	2007-399.ASM	Peters (2007)	7
2004-634.ASM	North, Ryden, and Schmidt (2004)	6, 7	2007-536.ASM	Archual (2007)	7
2004-644.ASM	North, Schmidt, and Ryden (2004)	7	2008-55.ASM	Luhnnow (2008)	6, 7
2004-671.ASM	Lausten (2004a)	6	2008-291.ASM	Darby (2008)	6, 7
2004-735.ASM	Lausten (2004b)	7	2008-523.ASM	Tremblay (2007)	7
2004-757.ASM	Ruble (2004)	6	2008-524.ASM	Bellavia and Mitchell (2007a)	6, 7
2004-785.ASM	Mitchell and Schmidt (2004a)	7	2009-478.ASM	Rayle and Fangmeier (2009a, 2009b, 2009c, 2009d, 2009e, 2009f, 2009g, 2009h)	7
2004-786.ASM	Mitchell and Schmidt (2004b)	7	2009-549.ASM	Bellavia and Mitchell (2007b)	7
2004-1719.ASM	Cogswell (2004)	7	2009-795.ASM	Luchetta and Moses (2009a)	5
2004-1794.ASM	Schmidt and Mitchell (2004a)	5	2009-796.ASM	Luchetta and Moses (2009b)	5
2004-1877.ASM	Baker (2002)	6	2009-797.ASM	Luchetta and Moses (2009c)	5

Table 2. Previous research in the study area buffer for the Reata Wash Flood Control Improvement Study.

Reference number	Author and year	Figure	Reference number	Author and year	Figure
2009-800.ASM	Luchetta and Moses (2009e)	5	2014-80.ASM	Walsh (2014)	7
2009-809.ASM	Luchetta and Moses (2009f)	5	7.230.SHPO	Opfenring (1965)	5
2009-811.ASM	Luchetta and Moses (2009g)	5	7.3001.SHPO	Unknown	3
2009-812.ASM	Luchetta and Moses (2009h)	5	7.3006.SHPO	Unknown	2, 3
2009-837.ASM	Luchetta and Moses (2009i)	5	7.3047.SHPO	Unknown	3
2010-80.ASM	Luchetta and Moses (2010a)	6	7.3439.SHPO	Unknown	3
2010-81.ASM	Luchetta and Moses (2010b)	6	7.3007.SHPO	Unknown	6, 7
2010-82.ASM	Luchetta and Moses (2010c)	5	7.3322.SHPO	Unknown	6, 7
2010-323.ASM	Luchetta and Moses (2010d)	5	7.3121.SHPO	Recon (1993)	7
2010-358.ASM	Luchetta and Moses (2010e)	5	SHPO-2001-1736/ SHPO-2001-2291/ SHPO-2001-2545	Ryden and Mitchell (2001)	6, 7
2010-359.ASM	Luchetta and Moses (2010f)	6, 7	SHPO-2001-3166	Slawson (2001b)	5
2010-378.ASM	Luchetta and Moses (2010g)	6	SHPO-2000-3191	Barnes (2000)	7
2010-428.ASM	Luchetta and Moses (2010h)	6	SHPO-2001-3269	Slawson (2001c)	6
2011-8.ASM	Stubing (2011)	5	SHPO-2002-36	Howard (2001)	7
2011-237.ASM	Stone (2011)	6	11-08.BLM	Unknown	7
2011-287.ASM	Luchetta and Moses (2011)	6	11-42-16B.BLM	Unknown	6
2011-631.ASM	Breternitz (2000)	7	Northland's Task 22	Unknown	6, 7
2011-652.ASM	Condrey and Breternitz (2003)	6, 7	Mesoamerican Mining Project/ Rainbow Bridge-Monument Valley Expedition	Unknown	6, 7
2012-30.ASM	Breternitz (2006)	7	SSI-96-6	Hansen (1996)	7
2014-26.ASM	Luchetta and Moses (2014)	7			

As these data from Table 2 (and Figures 5–6) illustrate, 10,895 acres (or approximately 78 percent) of the Reata Wash Study Area buffer has been previously surveyed. 4,146 acres (or approximately 71 percent) of the Reata Wash Study Area has been previously surveyed. Most survey work accomplished within the Reata Wash Study Area occurred within the southern and central portions. The northern portion of the Reata Wash Study Area buffer (south of Jomax Road and east of North Pima Road) has had less extensive investigations. However, this area has also largely been developed into private residences. The small portions that remain undeveloped have been previously surveyed (for example, see Foster and Werner 1994; Rapp 2003; Rozen 1985; and Schroeder 1994); however, SHPO Guidance Point No. 5 (April 2004) suggests that surveys conducted more than 10 years previously may not meet current professional standards, resulting in the need for new survey.

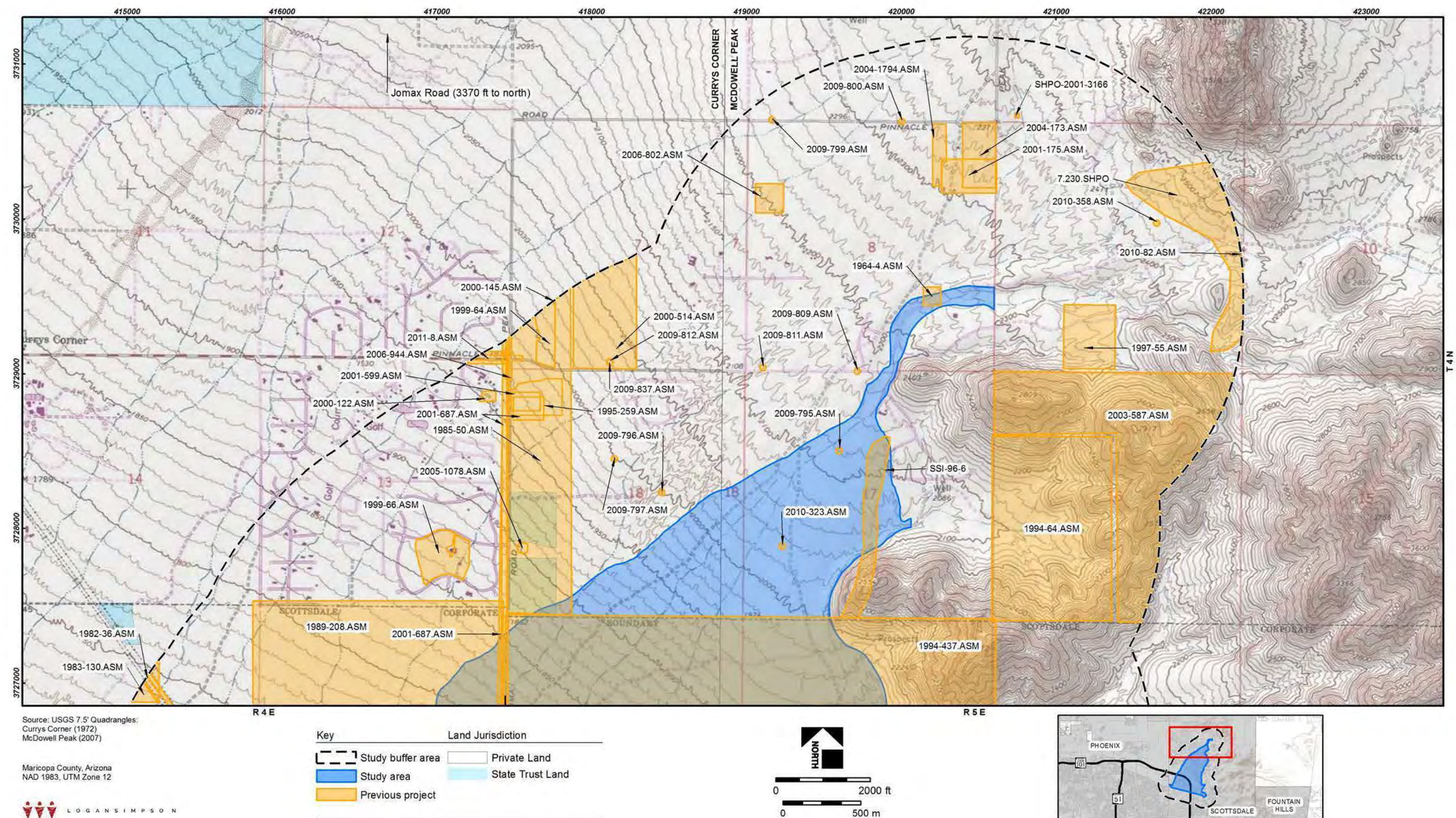


Figure 5. Previously conducted projects in the Reata Wash Study Area buffer limits.

GLO MAPS

The data compiled from the GLO maps are presented in Table 3 (see Figures 8–10) for the Reata Wash Study Area and Reata Wash Study Area buffer. The earliest of the historic surveys was recorded in 1916. Almost all of the early-recorded historic features were identified as roads. One of several roads depicted on GLO plat 00175 is named the “Road to Frazier Spring”. A small segment of this road was identified during survey and recorded as site AZ U:5:274(ASM) by EcoPlan Associates, Inc., in 2002. This site was recommended not eligible for listing to the NRHP (Baker 2002). One canal was also identified, the Rio Verde Canal. This canal was once considered the “largest storage irrigation enterprise in the United States” and was built in 1891 by the Rio Verde Canal Company in order to provide irrigation to desert land in north Scottsdale and Paradise Valley (San Francisco Chronicle [SFC], 23 April, 1893). This canal has previously been recorded as site AZ T:8:65(ASM) and has been determined ineligible for listing to the NRHP by the Arizona SHPO.

Table 3. Historic GLO maps and identified features within the Reata Wash Study Area and Reata Wash Study Area buffer.

Plat	Date Filed	Township	Range	Section	Features
00134	9-5-1916	T3N	R4E	1, 2	Rio Verde Canal
00142	9-18-1916	T3N	R5E	5, 6	Rio Verde Canal and 7 unnamed roads
00175	9-18-1916	T4N	R4E	24, 25, 26, 35, 36	3 unnamed roads, the Road to Frazier Spring, and the Rio Verde Canal
00177	2-26-1921	T4N	R5E	8, 17–19, 29–32	The Road to Frazier Spring, and 3 unnamed roads

PREVIOUS CLASS III CULTURAL RESOURCES SITES

Logan Simpson's research indicates that 42 sites—11 historic, 24 prehistoric, and 7 of unknown age and affiliation—have been recorded within the combined Reata Wash Study Area and one-mile buffer. Of these sites, 17 are located within the Reata Wash Study Area (Table 4; see Appendices Figures A.1–A.3). Historic-era cultural resources include the Rio Verde Canal, a habitation site, a possible mining claim, a possible campsite associated with construction of the Rio Verde Canal, the Road to Frazier Spring depicted on the 1916 GLO plat 00175, and various small artifact scatters, some with associated features. The canal and other historic-era resources attest to the Euro-American occupation and development of the region, primarily from the latter half of the nineteenth century to the mid-twentieth century. Of the prehistoric sites, most are affiliated with the Hohokam culture (A.D. 1–1450), although several have Archaic expressions. These sites include artifact scatters, temporary and permanent habitation sites, domestic and agriculture features, and petroglyphs.

In summary, approximately 78 percent of the Reata Wash Study Area buffer has been previously surveyed. Approximately 71 percent of the Reata Wash Study Area has been surveyed. Forty-two sites were previously recorded within the Reata Wash Study Area buffer; seventeen of these sites are located within the Reata Wash Study Area.

Table 4. Previously recorded sites in the study area buffer for the Reata Wash Flood Control Improvement Study.

Site number	Figure¹	Site type²	Affiliation/Age	NRHP eligibility	Location relative to the Reata Wash Study Area
AZ T:8:65(ASM)/ Rio Verde Canal	A.2, A.3	H-canal	Euro-American; A.D. 1894–1902	Determined not eligible	Inside, outside
AZ U:5:8(REC)	A.3	Unknown	Unknown	Unknown	Inside
AZ U:5:11(ASM)	A.1	P-feature	Prehistoric	Not evaluated	Inside, outside
AZ U:5:13(ASM)	A.3	P-artifact scatter	Hohokam	Not evaluated	Outside
AZ U:5:14(ASM)	A.3	H-feature	Historic; A.D. 1850–1950	Not evaluated	Inside
AZ U:5:28(ASM)	A.3	P-artifact scatter	Hohokam	Not evaluated	Inside
AZ U:5:30(ASM)	A.2, A.3	P-artifact scatter with feature	Hohokam; A.D. 900–1100	Determined not eligible	Outside
AZ U:5:37(ASM)	A.2	P-artifact scatter with feature	Prehistoric 8000 B.C.–A.D. 1500	Determined eligible (Criterion unknown)	Inside
AZ U:5:64(ASU)	A.3	Unknown	Unknown	Not evaluated	Outside
AZ U:5:69(ASU)	A.3	P-artifact scatter	Hohokam	Recommended eligible (Criterion unknown)	Inside, outside
AZ U:5:80(ASU)	A.1	P-petroglyphs	Prehistoric; 8000 B.C.–A.D. 1500	Recommended eligible (Criterion unknown)	Outside
AZ U:5:99(ASM)	A.3	H-artifact scatter	Historic; A.D. 1500–1950	Determined not eligible	Outside
AZ U:5:100(ASM)	A.3	U-feature	Unknown	Determined not eligible	Outside
AZ U:5:101(ASM)	A.3	U-feature	Unknown	Determined not eligible	Outside
AZ U:5:102(ASM)	A.3	H-artifact scatter	Historic; A.D. 1500–1950	Not evaluated	Outside
AZ U:5:141(ASM)	A.1	H-feature and artifact scatter	Historic; A.D. 1500–1950	Recommended not eligible	Outside
AZ U:5:142(ASM)	A.1	H-feature	Historic; A.D. 1500–1950	Determined not eligible	Outside
AZ U:5:149(ASM)	A.2	P-artifact scatter with feature	Hohokam	Determined eligible (Criteria C, D)	Outside
AZ U:5:150(ASM)	A.2	P-artifact scatter with feature	Hohokam	Determined eligible (Criterion D)	Inside
AZ U:5:151(ASM)	A.2	P-artifact scatter	Hohokam	Determined eligible (Criterion D)	Inside
AZ U:5:152(ASM)	A.1, A.2	P-artifact scatter with feature	Hohokam	Determined eligible (Criterion D)	Inside
AZ U:5:153(ASM)	A.2	P-artifact scatter	Hohokam	Not evaluated	Inside
AZ U:5:154(ASM)	A.3	P-feature	Hohokam	Not evaluated	Outside
AZ U:5:156(ASM)	A.2	P-artifact scatter with feature	Hohokam; A.D. 800–1300	Recommended eligible (Criterion unknown)	Inside

Table 4. Previously recorded sites in the study area buffer for the Reata Wash Flood Control Improvement Study.

Site number	Figure ¹	Site type ²	Affiliation/Age	NRHP eligibility	Location relative to the Reata Wash Study Area
<i>Continued</i>					
AZ U:5:157(ASM)	A.2	P-artifact scatter with feature	Hohokam; A.D. 800–1000	Not evaluated	Inside
AZ U:5:158(ASM)	A.2	P-artifact scatter with feature	Hohokam; A.D. 1100–1400	Not evaluated	Outside
AZ U:5:159(ASM)	A.2	P-artifact scatter with feature	Hohokam; A.D. 200–1500	Recommended eligible (Criterion unknown)	Outside
AZ U:5:160(ASM)	A.2	P-habitation	Prehistoric; 8000 B.C.–A.D. 1500	Not evaluated	Outside
AZ U:5:161(ASM)	A.2	P-artifact scatter with feature	Hohokam; A.D. 200–1500	Recommended eligible (Criterion unknown)	Outside
AZ U:5:162(ASM)	A.2	P-artifact scatter with feature	Hohokam; A.D. 200–1300	Recommended eligible (Criterion unknown)	Outside
AZ U:5:163(ASM)	A.2	P-artifact scatter with feature	Hohokam; A.D. 200–1500	Not evaluated	Outside
AZ U:5:224(ASM)	A.3	H-artifact scatter with feature	Historic; A.D. 1500–1950	Not evaluated	Outside
AZ U:5:239(ASM)/ Herberger Site/ Pinnacle Peak Village	A.1	P-habitation	Hohokam; A.D. 450–1100	Not evaluated	Outside
AZ U:5:245(ASM)	A.3	P-artifact scatter	Hohokam; A.D. 1000–1300	Recommended not eligible	Inside
AZ U:5:266(ASM)	A.3	P-artifact scatter	Prehistoric; 12000 B.C.–A.D. 1500	Recommended eligible (Criterion unknown)	Outside
AZ U:5:273(ASM)	A.3	H-habitation	Historic; A.D. 1500–1950	Recommended not eligible	Inside
AZ U:5:274(ASM)	A.2	H-road	Historic; A.D. 1500–1950	Recommended not eligible	Inside, outside
AZ U:5:275(ASM)	A.3	H-artifact scatter	Historic; A.D. 1500–1950	Recommended not eligible	Inside
AZ U:5:278(ASM)	A.1	H-artifact scatter	Historic; A.D. 1500–1950	Recommended eligible (Criterion D)	Outside
AZ U:5:352(ASM)	A.1	Unknown	Unknown	Unknown	Outside
#4 ARS	A.2	Unknown	Unknown	Unknown	Outside
IHCRS90-10	A.3	Unknown	Unknown	Unknown	Outside

¹ Map figures can be found within the appendices of the report. ² P = Prehistoric; H = Historic; U = Unknown

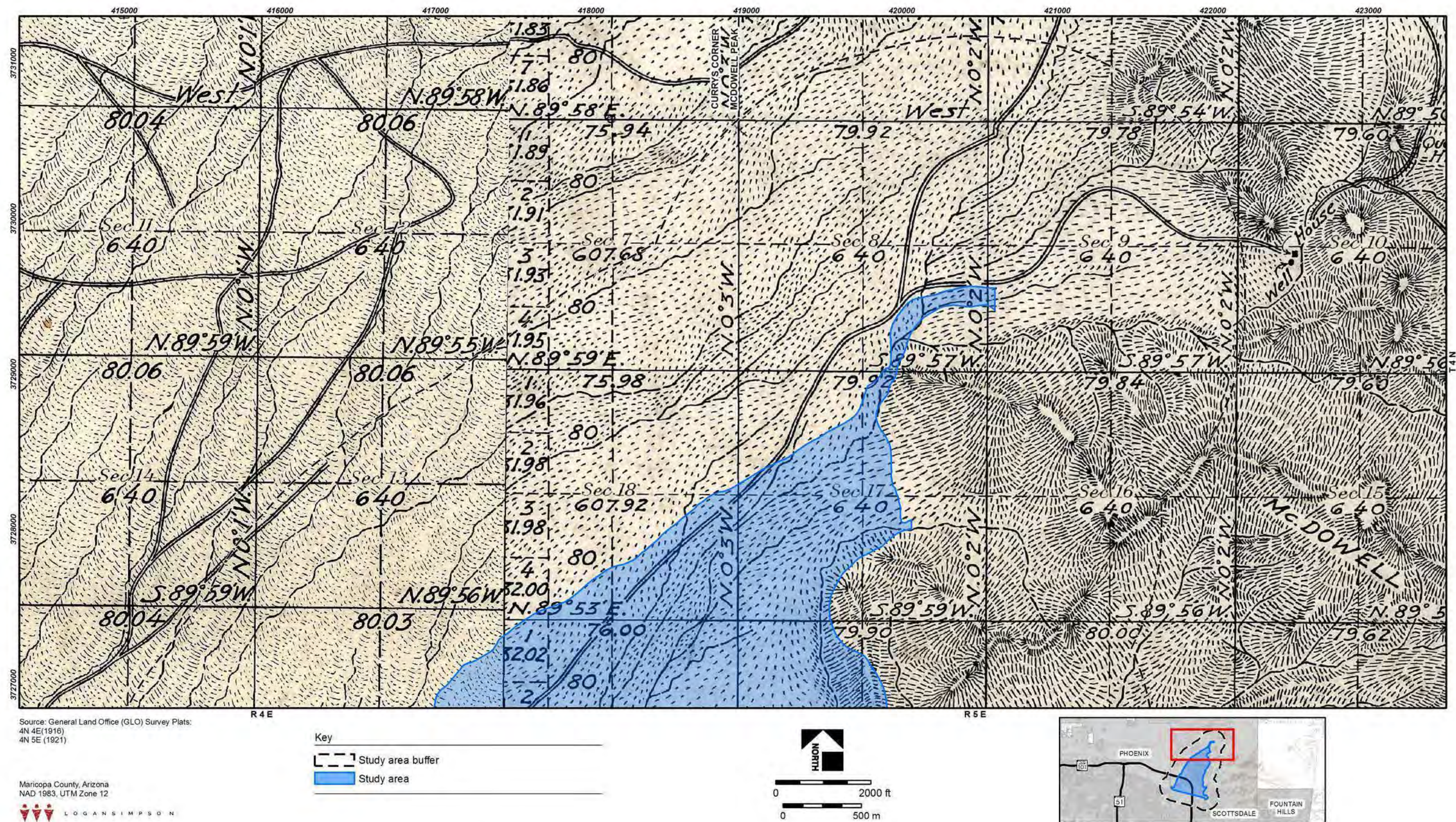


Figure 8. General Land Office features in the Reata Wash Study Area buffer limits.

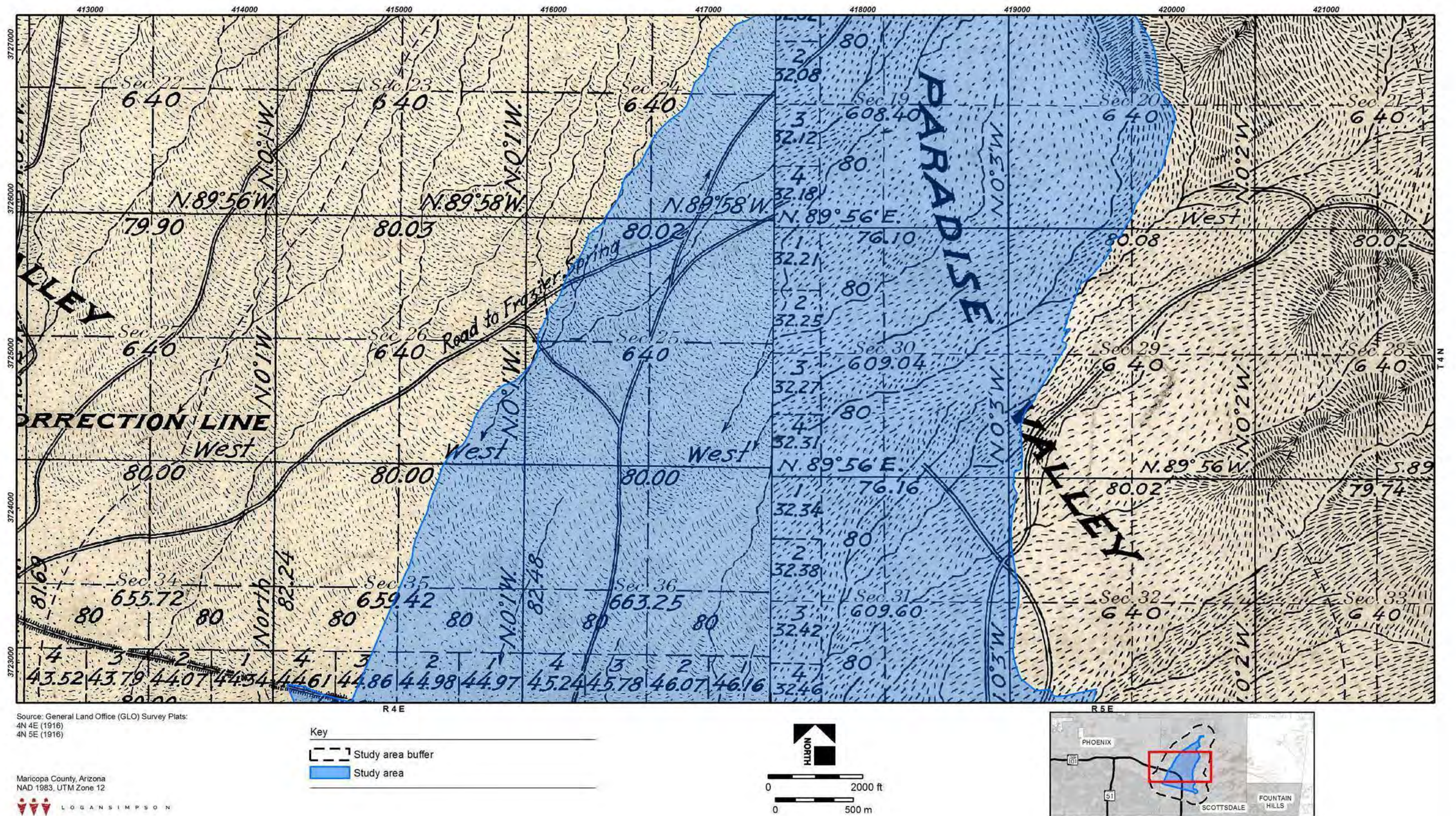


Figure 9. General Land Office features in the Reata Wash Study Area buffer limits.

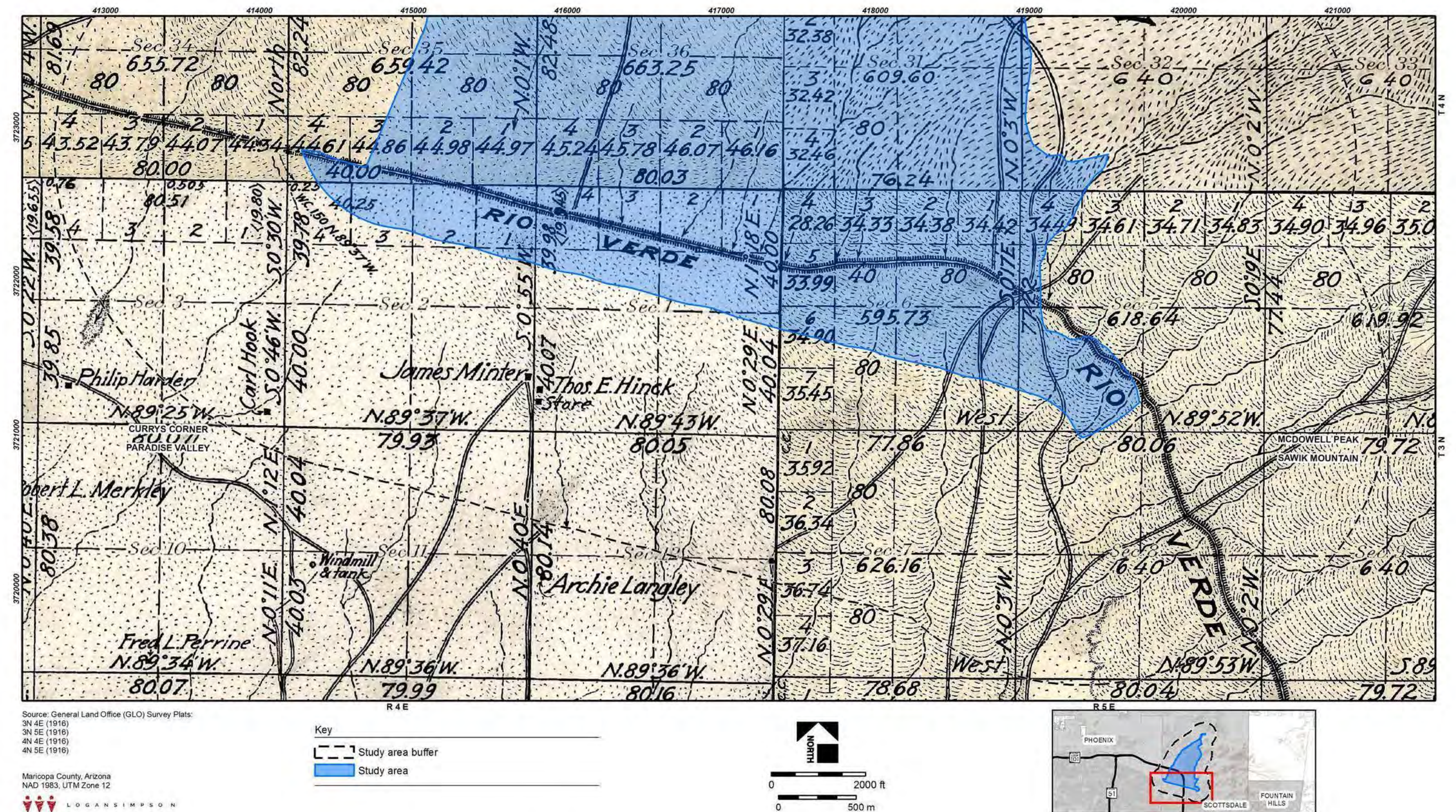


Figure 10. General Land Office features in the Reata Wash Study Area and Reata Wash Study Area buffer limits.

NATIONAL REGISTER OF HISTORIC PLACES AND SCOTTSDALE HISTORIC REGISTER-LISTED RESOURCES

The National Park Service's NRHP is the official list of historic places worthy of preservation, authorized by the National Historic Preservation Act of 1966. Historic properties determined eligible for inclusion in the NRHP must be at least 50 years old and possess integrity of location, design, setting, materials, workmanship, and association; and meet one of the following criteria:

- Association with events that have made a significant contribution to the broad patterns of our history (Criterion A); or
- Association with the lives of people of past significance (Criterion B); or
- Embodiment of the distinctive characteristics of a type, period or method of construction, or represent the work of a master or possess high artistic value (Criterion C), or;
- Has yielded or has the potential to yield information important to the prehistory or history of the area (Criterion D).

Five sites (all prehistoric) recorded in the Reata Wash Study Area and one-mile buffer have been determined eligible for inclusion in the NRHP. The prehistoric sites consist mainly of artifact scatters with associated features (AZ U:5:37[ASM], AZ U:5:149[ASM], AZ U:5:150[ASM], and AZ U:5:152[ASM]). One of the prehistoric sites is an artifact scatter (AZ U:5:151[ASM]).

Of these sites determined eligible for the NRHP by SHPO, four are located within the Reata Wash Study Area (AZ U:5:37[ASM], AZ U:5:150[ASM], AZ U:5:151[ASM] and AZ U:5:152[ASM]). AZ U:5:37(ASM) was recorded by Archaeological Research Services in 1990 and is a likely Hohokam site of unknown temporal affiliation consisting of two small concentrations of angular granite and basalt rocks spaced 75-ft apart. One concentration is 3.5 ft in diameter and contains 18-20 2- to 3-in-diameter rocks and a broken one-handed granite mano. The second concentration is approximately 6 ft in diameter and consists of 50-75 2- to 6-in-diameter rocks. These rock concentrations have been interpreted as the remains of prehistoric roasting pits. No ceramics were observed during site recording (Stone 1990).

AZ U:5:150(ASM), AZ U:5:151(ASM) and AZ U:5:152(ASM) were recorded by Soil Systems, Inc. in 1994, during the DC Ranch Survey. AZ U:5:150(ASM) is a likely Hohokam site of unknown temporal period composed of several possible rooms and two small sherd clusters. The best preserved structure is composed of a roughly circular room, 6 m in diameter, constructed of a cobble and boulder wall and cleared interior. It contains a circular central hearth or storage feature without charcoal. An amorphous aggregation of cobbles and boulders (3 m. in diameter), possibly representing a second room, abuts the first structure to the north. A possible third structure may be located to the east of the first structure. No artifacts were observed within the structures, but a pecked basalt ground stone fragment was identified to the southwest of the structure. The small sherd clusters were observed 75 m to the southwest and 30 m to the northeast of the structures. These clusters consisted of quartzite-tempered plainwares, likely from isolated pot breaks (Foster and Werner 1994).

AZ U:5:151(ASM) consists of a dispersed low density lithic and sherd scatter with no surficial features. Lithics consist of three vesicular basalt metate fragments and chert flakes. Ceramics observed included of Salado White-on-red, Gila polychrome and quartzite-tempered, mica schist-tempered and phyllite-tempered plainwares (Foster and Werner 1994). The presence of Salado White-on-red indicates association with the Salado Culture centered on the Tonto Basin of central Arizona, and was most abundant during the Classic period (A.D. 1270–1450) (Simon et al. 1998).

AZ U:5:152(ASM) is a likely Hohokam site of unknown temporal period consisting of a small “L”-shaped alignment of cobbles that may form part of a room or foundation. Artifacts found in association with this feature included 10 prehistoric phyllite-tempered plainware sherds, and 3 mica schist- and quartz-tempered plainware sherds (Foster and Werner 1994).

The NRHP-eligibility status of the remaining sites within the Reata Wash Study Area buffer identified during this research are as follows: 6 sites were determined not eligible for inclusion in the NRHP, 8 sites were recommended eligible, 5 sites were recommended not eligible, and 18 sites were unevaluated.

The Scottsdale Historic Register was established in 1999 by the Scottsdale Historic Preservation Ordinance No. 3242. For a property or district to be eligible for listing, the resource must be linked to a time and a place, to historical events, and/or to the accomplishments of prominent people. No historic resources are listed within the Scottsdale Historic Register or the NRHP within the Reata Wash Study Area or Reata Wash Study Area buffer.

SUMMARY AND RECOMMENDATIONS

The City of Scottsdale Reata Wash Study is completing an evaluation of the Reata Wash floodplain to identify and recommend flood control measures to reduce flood risks to residents, property and public infrastructure. The Reata Wash Study Area encompasses 5,814 acres between the alluvial fan apex just south of Pinnacle Peak Road and the CAP canal. The City of Scottsdale has requested that Logan Simpson prepare a Class I cultural resources inventory to assess the level of previous cultural resources survey and to identify known cultural resources sites within the Reata Wash Study Area and the surrounding one-mile wide buffer. Considerations include the methods and coverage or extent of past surveys, and the number of identified cultural resources that have been recommended or determined eligible for inclusion in the NRHP. The Reata Wash Study Area and buffer for the Class I inventory encompasses 17,978 acres within an area bounded by Jomax Road to the north, N. 64th Street to the west, E. Cactus Road to the south, and the McDowell Mountains to the east.

Logan Simpson's research identified 191 previously conducted projects in the Reata Wash Study Area and one-mile buffer. Background research results indicate that approximately 78 percent of the cultural resources Reata Wash Study Area and Reata Wash Study Area buffer has been surveyed. Approximately 71 percent of the Reata Wash Study Area has been previously surveyed. Overall, 42 cultural resources sites have been recorded in the Reata Wash Study Area and the buffer, including 17 within the Reata Wash Study Area. Of the 42 cultural resources sites, 5 sites within the Reata Wash Study Area and Reata Wash Study Area buffer have been determined eligible for inclusion in the NRHP. Four of these sites

determined eligible for the NRHP are located within the Reata Wash Study Area. Seven of the 17 sites within the Reata Wash Study Area were recorded before April 1994 and should be reevaluated for their NRHP-eligibility because they were recorded under an outdated site definition, per SHPO Guidance Point No. 5 (April 2004). Ten sites have been recorded using the current site definition. These sites should be revisited to document their current condition.

SHPO Guidance Point No. 5 (April 2004) suggests that surveys conducted more than 10 years previously may not meet current professional standards, resulting in the need for new survey. Based on this, Logan Simpson recommends that new survey be conducted in areas of the Reata Wash Study Area in which previous surveys do not meet current standards (approximately 700 acres) (Table 5; see also Figures 11 & 12). Pedestrian survey should also be conducted for unsurveyed portions of the Reata Wash Study Area (approximately 1700 acres).

Upon the completion of a Class III survey and site relocation and recordation, recommendations should be made for the treatment, preservation, or avoidance of sites, as appropriate. Based on current research, it is known that four sites within the Reata Wash Study Area have been determined NRHP-eligible by SHPO. If federal funds are involved and it is subsequently determined that one or more NRHP-eligible cultural resources cannot be avoided by project activities, a Memorandum of Agreement or Programmatic Agreement should be developed to resolve the adverse effect of the project to historic properties.

Table 5. Survey Recommendation Summary for the Reata Wash Flood Control Improvement Study.

Township	Range	Section	Acres Surveyed	Acres Unsurveyed	Total Acres	Acres needing survey/ resurvey	Figure	Recommendation
3N	4E	1	51.39	228.43	279.82	226.37	12	All portions of the PA within T3N, R4E, Sec. 1 not surveyed should be surveyed. Area surveyed by projects 7.3006.SHPO, 7.3305.SHPO (excluding areas surveyed by any other projects) should be re-surveyed as these projects do not meet current ASM guidelines.
3N	4E	2	4.08	110.31	114.39	109.93	12	All portions of the PA within T3N, R4E, Sec. 2 not surveyed should be surveyed. Area surveyed by projects 7.3006.SHPO, 7.3322.SHPO (excluding areas surveyed by any other projects) should be re-surveyed as these projects do not meet current ASM guidelines.
3N	5E	5	70.68	64.29	134.97	64.02	12	All portions of the PA within T3N, R5E, Sec. 5 not surveyed should be surveyed. Area surveyed by 7.3121.SHPO (excluding areas surveyed by any other projects) should be re-surveyed as this project does not meet current ASM guidelines.
3N	5E	6	251.19	168.17	419.36	164.07	12	All portions of the PA within T3N, R5E, Sec. 6 not surveyed should be surveyed. Area surveyed by Northland's Task 22 (excluding areas surveyed by any other projects) should be re-surveyed as this project does not meet current ASM guidelines.
3N	5E	8	0.49	0.58	1.07	0.58	12	All portions of the PA within T3N, R5E, Sec. 8 not surveyed should be surveyed using current ASM guidelines.
4N	4E	24	216.80	0.00	216.80	199.54	11	All portions of the PA within T4N, R4E, Sec. 24 previously surveyed by project 1989-208.ASM (excluding areas surveyed by any other projects) should be resurveyed using current ASM guidelines.
4N	4E	25	581.76	0.00	581.76	473.83	11, 12	Portions of the PA within T4N, R4E, Sec. 25 previously surveyed by project 1989-208.ASM (excluding areas surveyed by any other projects) should be resurveyed using current ASM guidelines.
4N	4E	26	42.62	0.00	42.62	19.88	11, 12	All portions of the PA within T4N, R4E, Sec. 26 previously surveyed by project 1989-208.ASM (excluding areas surveyed by any other projects) should be resurveyed using current ASM guidelines.
4N	4E	35	156.01	193.53	349.54	202.83	12	All portions of the PA within T4N, R4E, Sec. 35 not surveyed should be surveyed. Area surveyed by projects 7.3006.SHPO, 7.3007.SHPO, 7.3322.SHPO and the Mesoamerican Mining Project (excluding areas surveyed by any other projects) should be re-surveyed as these projects do not meet current ASM guidelines.

continued

Table 5. Survey Recommendation Summary for the Reata Wash Flood Control Improvement Study.

Township	Range	Section	Acres Surveyed	Acres Unsurveyed	Total Acres	Acres needing survey/ resurvey	Figure	Recommendation
4N	4E	36	663.14	0.00	663.14	43.42	12	Portions of the PA within T4N, R4E, Sec. 36 previously surveyed by project 1982-36.ASM, 1989-208.ASM and Northland's Task 22(excluding areas surveyed by any other projects) should be resurveyed using current ASM guidelines.
4N	5E	8	2.02	23.79	25.81	25.81	11	All portions of the PA within T4N, R5E, Sec. 8 not surveyed should be surveyed. Area surveyed by project 1964-4.ASM should be re-surveyed as this project does not meet current ASM guidelines.
4N	5E	17	20.12	224.79	244.91	224.79	11	All portions of the PA within T4N, R5E, Sec. 17 not surveyed should be surveyed using current ASM guidelines.
4N	5E	18	7.48	141.78	149.27	149.20	11	All portions of the PA within T4N, R5E, Sec. 18 not surveyed should be surveyed. Area surveyed by project 1985-50.ASM should be re-surveyed as this project does not meet current ASM guidelines.
4N	5E	19	605.14	1.27	606.40	1.25	11	No further survey required.
4N	5E	20	351.11	0.00	351.11	0.00	11	No further survey required.
4N	5E	29	121.12	2.43	123.55	2.45	11, 12	All portions of the PA within T4N, R5E, Sec. 29 not surveyed should be surveyed using current ASM guidelines.
4N	5E	30	54.72	553.99	608.71	554.05	11, 12	All portions of the PA within T4N, R5E, Sec.30 not surveyed should be surveyed using current ASM guidelines.
4N	5E	31	604.19	5.33	609.52	3.05	12	All portions of the PA within T4N, R5E, Sec. 31 not surveyed should be surveyed using current ASM guidelines.
4N	5E	32	42.59	0.18	42.76	0.49	12	All portions of the PA within T4N, R5E, Sec. 32 not surveyed should be surveyed using current ASM guidelines.

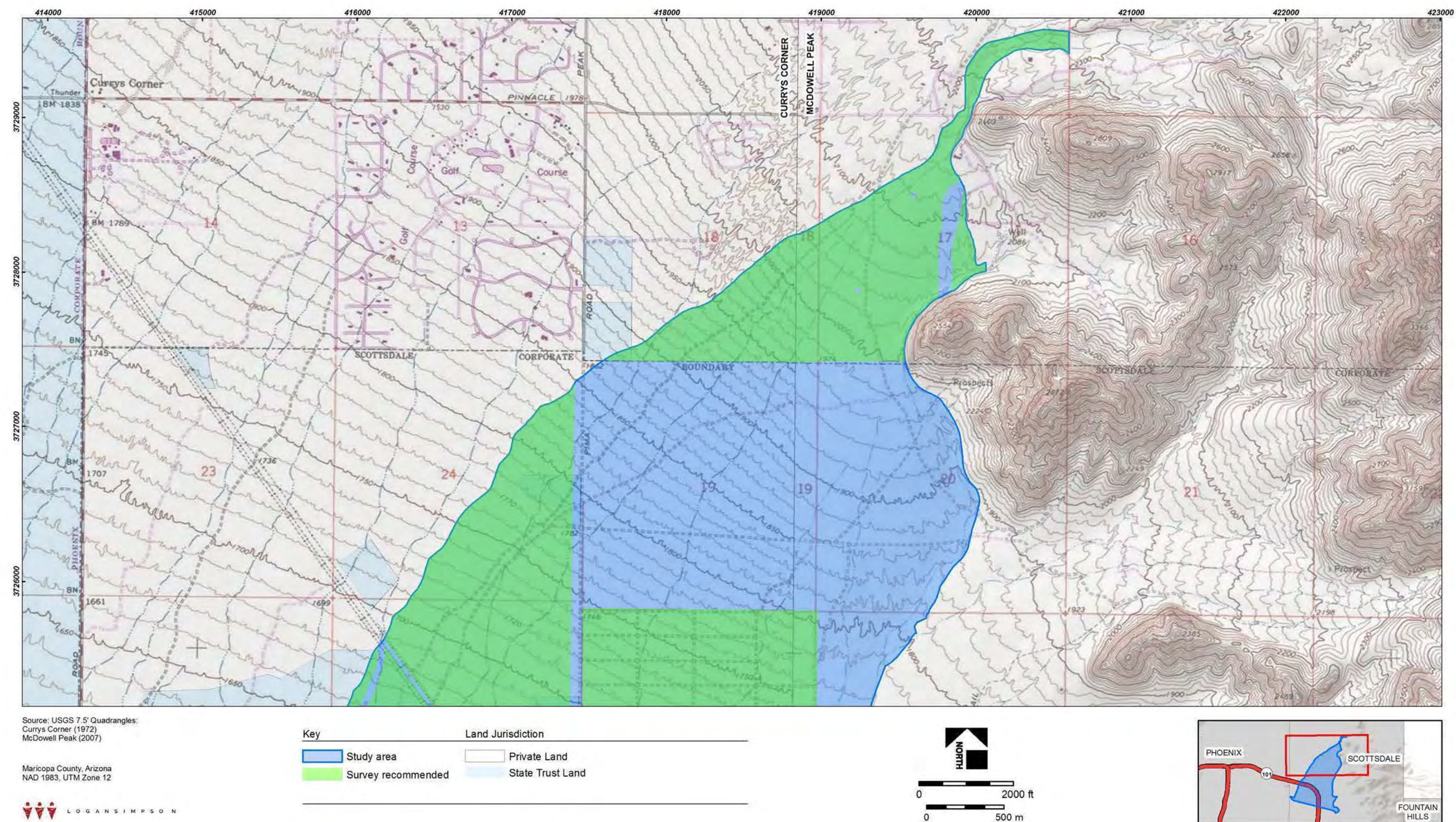


Figure 11. Areas within the Reata Wash Study Area recommended for new survey.

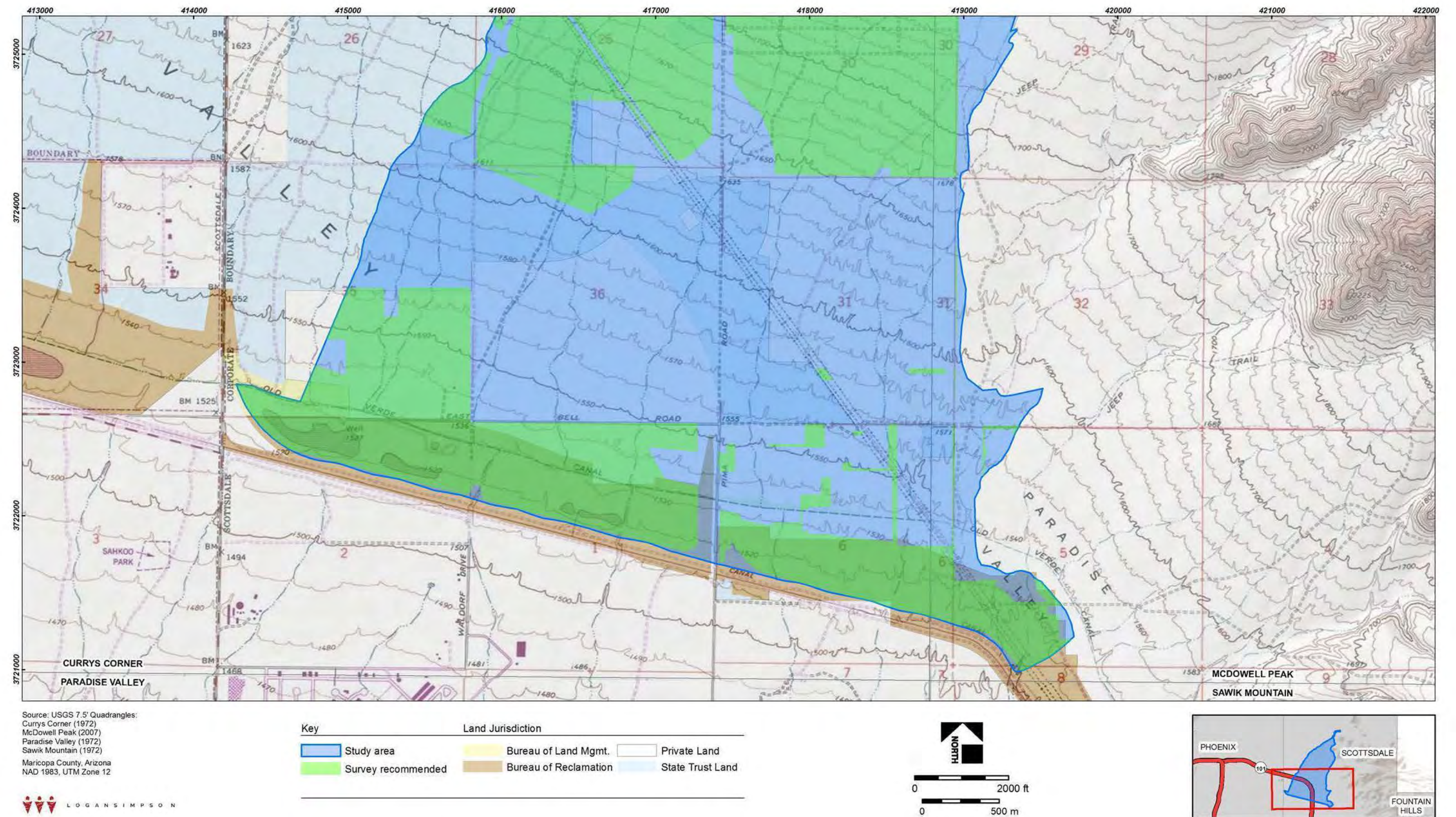


Figure 12. Areas within the Reata Wash Study Area recommended for new survey.

REFERENCES

- Adams, K.
1998 *Archaeological Assessment of a Parcel for the Scottsdale Medical Plaza, Maricopa County, Arizona*. Archaeological Consulting Services, Tempe.
- Aguila, L.
1999 *Cultural Resource Assessment for a Proposed AT&T Wireless Service Site Near Pima Road and Union Hills Drive, North Scottsdale, Maricopa County, Arizona*. Archaeological Consulting Services, Tempe.
2000a *Cultural Resource Assessment for Celebration of Fine Art, North Scottsdale, Maricopa County, Arizona*. Archaeological Consulting Services, Tempe.
2000b *A Cultural Resources Assessment for the Sun Airpark Corporate Center, Lot 1, North Scottsdale, Maricopa County, Arizona*. Archaeological Consulting Services, Tempe
- Alter, E. and K. Dobschuetz
2004 *A Cultural Resources Survey of 64 Acres for the Proposed City of Scottsdale Center Drive and Frontage Road-West Project (COS #S0404 and #S0405), Maricopa County, Arizona*. Report No. 2004-1433. EPG, Phoenix.
- Archual, A. J.
2007 *Cultural Resources Survey of 17 Acres for Arizona Department of Transportation Materials Source in Scottsdale, Maricopa County, Arizona*. ADOT Project No. 05093EA. Archaeological Consulting Services, Tempe.
- Arizona State Museum
1985a *Letter Report to Arizona State Land Department. Dated 2-20-1985*. Tucson.
1985b *Letter Report to Arizona State Land Department Dated 5-24-1985*. Tucson.
- Ayres, J. E.
1965 *A Summary of Archaeological Sites in Maricopa County*. Arizona State Museum, Tucson.
- Agenbroad, L. D.
1967 The Distribution of Fluted Points in Arizona. *The Kiva* 32:113–20.
- Arizona Board of Regents
1989 *The WPA Guide to 1930s Arizona*. Reprinted. University of Arizona Press, Tucson. Originally published 1940, *Arizona: A State Guide*, Arizona State Teachers College, Flagstaff.
- Baker, J. L.
2002 *A Cultural Resource Survey of the Hayden Road Improvement Project Segments 2 and 3, Scottsdale, Maricopa County, Arizona*. Report 02-553. EcoPlan Associates, Inc., Mesa.
- Barnes, B. N.
2000 *A Cultural Resources Survey of Approximately 0.06 Acre Parcel at the Base of a Proposed Cellular Telephone Antenna Tower Located at 8555 E. Frank Lloyd Wright Boulevard, Scottsdale, Maricopa County, Arizona*. Archaeological Research Services, Tempe.
- Bellavia, C. and D. R. Mitchell
2005a *Archaeological Survey of Approximately 8.66 Acres Located at the Northwest Corner of Greenway Road and 76th Street in Scottsdale, Maricopa County, Arizona*. Report No. 05-31. SWCA, Environmental Consultants, Phoenix.

- 2005b *Archaeological Survey of Approximately 8 Acres at the Intersection of Grande Vista and Desert Vista Roads (Lots 14 and 15) in Scottsdale, Maricopa County, Arizona*. Report No. 05-01. SWCA, Environmental Consultants, Phoenix.
- 2005c *Archaeological Survey of the 7.4-Acre Cholla Parcel, Scottsdale, Maricopa County, Arizona*. Report No. 05-032. SWCA, Environmental Consultants, Phoenix.
- 2007a *A Cultural Resources Survey of 130 Acres for the Core South 22 Parcel in Scottsdale, Maricopa County, Arizona*. Report No. 07-70. SWCA, Environmental Consultants, Phoenix.
- 2007b *Archaeological Survey of the McDowell Mountain Ranch Park Parcel 4 in Scottsdale, Maricopa County, Arizona*. Report No. 07-22. SWCA, Environmental Consultants, Phoenix.
- Bellavia, C., D. R. Mitchell, and R. Ryden
 2005 *Archaeological Survey of 4.6 Acres at 7777 E. Princess Boulevard in Scottsdale, Maricopa County, Arizona*. Report No. 05-09. SWCA, Environmental Consultants, Phoenix.
- Boloyan, D. S.
 2001 *Archaeological Survey: Seven Acres on Raintree Drive Near Thompson Peak Parkway, Scottsdale, Maricopa County, Arizona*. David S. Boloyan Archaeological Services, Tempe.
- Breen, J.
 2002 *A Cultural Resources Survey of 3.9 Acres Located North of Greenway-Hayden Loop and West of Dial Boulevard, Scottsdale, Maricopa County, Arizona*. Report No. 025203. Logan Simpson Design, Tempe.
- Breternitz, C. D.
 1989 *A Cultural Resources Survey for the Core North Project, North Scottsdale, Maricopa County, Arizona*. Soil Systems, Inc., Phoenix.
- 2000 *A Cultural Resources Survey of Lots 10 and 11 at the Scottsdale Airpark, Maricopa County, Arizona*. Report No. 00-52. Soil Systems, Inc., Phoenix.
- 2006 *A Cultural Resources Survey of Approximately 4.5 Acres of Private Land at the Northeast Corner of 98th Street and McDowell Mountain Ranch Road in North Scottsdale, Maricopa County, Arizona*. Report 04-16. Soil Systems, Inc., Phoenix.
- Brown, P. E.
 1978 *Granite Reef Aqueduct and Transmission System Project. A Cultural Resource Survey of Reach 11 of the Granite Reef Aqueduct, Central Arizona Project*. Office of Cultural Resource Management, Department of Anthropology, Arizona State University, Tempe.
- Brown, K. L. and S. Crespín (editors)
 2009 *The Transwestern Phoenix Expansion Project, Data Recovery at 19 Sites on BLM, Arizona State, and Private Land. Pipeline Mileposts 49.7 to 103.7, Maricopa and Yavapai Counties, Arizona Volume 3*. Report No. 48936-C-123. TRC, Albuquerque.
- Cable, J. S., and D. E. Doyel
 1987 *Pioneer Village Structure and Settlement Pattern in the Phoenix Basin*. In *The Hohokam Village*, edited by D. E. Doyel, pp. 21–70. Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science. Glenwood Springs, Colorado.
- Chenault, M. L.
 2000 *In Defense of the Polvorón Phase*. In *The Hohokam Village Revisited*, edited by D. E. Doyel, S. K. Fish, and P. R. Fish, pp. 277–86. Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science. Fort Collins, Colorado.

- Chronic, H.
1983 *Roadside Geology of Arizona*. Mountain Press, Missoula, Montana.
- Cogswell, J. W.
2003 *Cultural Resources Survey of Approximately One Acre at 15450 North 84th Street, Scottsdale, Arizona*. Report No. 03-67. Northland Research, Inc., Tempe.
2004 *A Cultural Resources Survey of 1.5 Acres at 15656 N. 76th Street, Scottsdale, Arizona*. Report No. 04-79. Northland Research, Inc., Tempe.
- Condrey, P. L., and C. D. Breternitz
2003 *A Cultural Resources Survey of Approximately 18 Acres of Private Land for Monterey Homes in North Scottsdale, Maricopa County, Arizona*. Report No. 03-19. Soil Systems, Inc., Phoenix.
- Coriell, T.
2002 *Cultural Resources Survey of the Proposed 10 Acre Westworld Trailhead, Near Thompson Peak Parkway and Hayden Rhodes Aqueduct, in Scottsdale, Maricopa County, Arizona*. Report No. 2002:008. Archaeological Research Services, Tempe.
- Courtright, J. S.
2000a *A Cultural Resources Survey of 1.4 Acres of Private Land for the Proposed Construction of the Shrimpton Office Building and Hangar, Scottsdale, Maricopa County, Arizona*. Logan Simpson Design, Tempe.
2000b *A Cultural Resources Survey of Ninety Five Acres Located at the Southeast Corner of Pima and Happy Valley Roads, Scottsdale, Maricopa County, Arizona*. Technical Report No. 005146. Logan Simpson Design, Tempe.
2000c *A Cultural Resources Survey of 35.5 Acres Located North of Westworld and East of Pima Road, Scottsdale, Maricopa County, Arizona*. Technical Report No. 005200. Logan Simpson Design, Tempe.
- Crown, P. L.
1991 The Hohokam: Current Views of Prehistory and the Regional System. In *Chaco and Hohokam: Prehistoric Regional Systems in the American Southwest*, edited by P. L. Crown and W. J. Judge, pp. 135–57. School of American Research Press, Santa Fe.
- Crown, P. L., and E. W. Sires, Jr.
1984 The Hohokam Chronology and Salt-Gila Aqueduct Research. In *Hohokam Archaeology Along the Salt-Gila Aqueduct, Central Arizona Project: Synthesis and Conclusions*, edited by L. S. Teague and P. L. Crown, pp. 73–86. Archaeological Series No. 150, Vol. 9. Arizona State Museum, University of Arizona, Tucson.
- Crownover, S.
1994 *Archaeological Assessment of the North Landfill Project, Biscuit Flat, Arizona*. Archaeological Consulting Services, Tempe.
- Curtis, R. S., and L. M. Stone
1988 *Cultural Resources Survey of a Ten Mile Long Segment of the Proposed Outer Loop Freeway Between 15th Avenue and Scottsdale Road, North-Central Maricopa County, Arizona*. Archaeological Research Services, Tempe.
- Damron, J. R.
1990 *Evans Withycombe Inc.'s Proposed Water Storage Tank Survey, City of Scottsdale*. Report submitted to U.S. Bureau of Reclamation, Phoenix.
- Darby, C. A.
2008 *Cultural Resources Survey of 1.32 Miles along the Gateway and Horseshoe Trails, McDowell Sonoran Preserve, Scottsdale, Maricopa County, Arizona*. Report No. 08-108. Desert Archaeology, Tucson.

- Davis, M.
2000 *A Phase I (Class III) Archaeological Survey of 4.8 Acres at 96th Street and Redfield Road, Scottsdale, Maricopa County, Arizona*. C.O.S. Case #37-PA-00. CRDCR #113. The Louis Berger Group, Inc., Phoenix.
- Davis, M. and J. W. Hohmann
2001 *A Phase I (Class III) Archaeological Survey of a 0.5 Acre Cell Tower Site at 15550 N. Thompson Peak Parkway, Scottsdale, Maricopa County, Arizona*. Report No. 345. Louis Berger Group, Phoenix.
- Dean, J. S.
1991 Thoughts on Hohokam Chronology. In *Exploring the Hohokam: Prehistoric Desert Peoples of the American Southwest*, edited by G. J. Gumerman, pp. 61–149. New World Studies Series No. 1. Amerind Foundation, Dragoon, Arizona, and University of New Mexico Press, Albuquerque.
- DeMaagd, H. S.
1996 *Archaeological Survey of the Arizona Public Service Company's Downing Substation and an Access Road, Scottsdale, Maricopa County, Arizona*. Project # 96-46. Archaeological Consulting Services, Tempe.
2000 *Cultural Resources Assessment for Arizona Public Service Company Conduits Through Pima Freeway, Scottsdale, Maricopa County, Arizona*. Archaeological Consulting Services, Tempe.
- Doelle, W.
1981 The Gila Pima in the Late Seventeenth Century. In *The Protohistoric Period in the North American Southwest, A.D. 1450–1700*, edited by D. R. Wilcox and W. B. Masse, pp. 57–70. Anthropological Research Papers No. 24. Arizona State University, Tempe.
- Douglas, D. L.
1994 *An Archaeological Survey for the Thompson Peak Substation and Associated 69kV Powerline Extension, Scottsdale, Maricopa County, Arizona*. Archaeological Consulting Services, Tempe.
- Downum, C., and T. W. Bostwick
2003 The Platform Mound. In *Centuries of Decline during the Hohokam Classic Period at Pueblo Grande*, edited by D. Abbott, pp. 166–200. University of Arizona Press, Tucson.
- Doyel, D. E.
1991 Hohokam Cultural Evolution in the Phoenix Basin. In *Exploring the Hohokam: Prehistoric Desert Peoples of the American Southwest*, edited by G. J. Gumerman, pp. 231–78. New World Studies Series No. 1. Amerind Foundation, Dragoon, Arizona, and University of New Mexico Press, Albuquerque.
1995 A Regional Perspective on the Late Classic Period in the Phoenix Basin. In *Archaeological Excavations at Pueblo Blanco: The MCDOT Alma School Road Project*, Vol. 2, edited by D. E. Doyel, A. T. Black, and B. S. Macnider, pp. 483–95. Archaeological Resources Report No. 90. Archaeological Consulting Services, Tempe.
- Erickson, K. and A. E. Rogge
2004 *Cultural Resource Survey for Verizon Wireless Telecommunications Tower Site: PHO Caribbean, Scottsdale, Maricopa County, Arizona*. Report No. 2004-8 (AZ). URS Corporation, Phoenix.
- Fish, S. K., P. R. Fish, and J. H. Madsen
1992 Evidence for Large-Scale Agave Cultivation in the Marana Community. In *The Marana Community in the Hohokam World*, edited by S. K. Fish, P. R. Fish, and J. H. Madsen, pp. 73–87. Anthropological Papers No. 56. University of Arizona Press, Tucson.
- Foster, M. S.
1995 *An Isolated Prehistoric Rock Art Locality, AZ U:5:154(ASM), McDowell Mountain Ranch Development, North Scottsdale, Maricopa County, Arizona*. Technical Report No. 95-1. Soil Systems, Phoenix.

- Foster, M. S., M. D. Werner
 1994 *A Cultural Resources Survey of Two Sections of the DC Ranch Property, North Scottsdale, Maricopa County, Arizona*. Technical Report No. 94-40. Soil Systems, Phoenix.
- Foster, M. S., and D. R. Mitchell
 2001 *An Archaeological Survey of the 40 Acre Assemblage Development Between 98th and 100th Streets, Scottsdale, Maricopa County, Arizona*. Report No. 01-321. SWCA, Environmental Consultants, Phoenix.
- Foster, M. S.
 2001 *An Archaeological Survey of 4.3 Acres for the Avalon Aviation Hangar Project, Scottsdale, Maricopa County, Arizona*. Report No. 01-410. SWCA, Environmental Consultants, Phoenix.
- Foster, W. P.
 1982 *Letter Report on Northeast Associates Residential and Commercial Development – A Cultural Resource Survey, SLD Application Number 53-85351*. On file at the Arizona State Museum, Tucson.
- Frison, K.
 2001 *A Cultural Survey of Approximately 0.06 Acres of Aztec Park, Scottsdale, Maricopa County, Arizona*. Archaeological Resource Services, Tempe.
- Gage, G. S.
 2004 *Cultural Resources Survey of 3.97 Acres Near 83rd Way and Hayden Road, Scottsdale, Maricopa County, Arizona*. Report No. 04-125. Northland Research, Inc., Tempe.
- Gifford, D.
 1994a *Cultural Resource Survey for the Greenway-Hayden Road Crossing of the Reach 11 Dike Drill Test Pits*. Phoenix. Bureau of Reclamation Cultural Resource Survey Form Report DI-BR-APO-ICRS-94-8. Phoenix.
 1994b *Cultural Resource Survey for the Greenway-Hayden Road Crossing of the Reach 11 Dike Potential Borrow Pit and Retention Basin*. Bureau of Reclamation Cultural Resource Survey Form Report DI-BR-APO-ICRS-94-15. Phoenix.
 1995 *Cultural Resource Survey for a Pipe (Bullnose) Construction Project in Relation to the Greenway-Hayden Road Crossing of the C.A.P. Reach 11 Dike*. Bureau of Reclamation Cultural Resource Survey Form Report DI-BR-APO-ICRS-95-3. Phoenix, Arizona.
- Gifford, E. W.
 1932 *The Southeastern Yavapai*. Publications in American Archaeology and Ethnology, Vol. 29, No. 3. University of California Press, Berkeley.
 1936 *Northeastern and Western Yavapai*. Publications in American Archaeology and Ethnology, Vol. 34, No. 4. University of California Press, Berkeley.
- Gladwin, H. S., E. W. Haury, E. B. Sayles, and N. Gladwin
 1937 *Excavations at Snaketown: Material Culture*. Medallion Papers 25. Gila Pueblo, Globe.
- Green, M.
 1981 *A Cultural Resource Survey for the Proposed APS Substation at Pima and Thunderbird Roads*. Archaeological Consulting Services, Tempe.
- Greenaker, A. M.
 1997 *Cultural Resource Inventory of a 5.4-Acre Parcel in Section 6, T3N, R5E, Maricopa County, Arizona*. Western Cultural Resource Management, Farmington, New Mexico.

Gregory, D. A.

- 1987 The Morphology of Platform Mounds and the Structure of Classic Period Hohokam Sites. In *The Hohokam Village: Site Structure and Organization*, edited by D. E. Doyel, pp. 183–210. American Association for the Advancement of Science, Glenwood Springs, Colorado.
- 1991 Form and Variation in Hohokam Settlement Patterns. In *Chaco and Hohokam: Prehistoric Regional Systems in the American Southwest*, edited by P. L. Crown and W. J. Judge, pp. 159–94. School of American Research Press, Santa Fe.

Hackbarth, M. R.

- 1991 *Archaeological Survey of Twenty Acres in Northern Scottsdale, North-Central Maricopa County, Arizona*. Northland Research, Phoenix.
- 1992 *Prehistoric and Historic Occupation of the Lower Verde River Valley: The State Route 87 Verde Bridge Project*. Northland Research, Flagstaff.
- 1998 *Archaic and Hohokam Occupation of the Mayo Boulevard Study area in Northeastern Phoenix, Arizona*. Anthropological Papers No. 8. Pueblo Grande Museum, Phoenix.
- 2001a *Archaeological Survey of Airport Property Specialists Lot #215-48-055R in Scottsdale Airpark, Maricopa County, Arizona*. Report No. 01-23. Northland Research, Tempe.
- 2001b *Archaeological Survey of the Proposed Notre Dame Preparatory High School in North Scottsdale, Maricopa County, Arizona*. Report No. 01-91. Northland Research, Tempe.
- 2003 *Archaeological Survey at Pima Road and Downing-Olson Drive, North Scottsdale, Maricopa County, Arizona*. Report No. 03-14. Northland Research, Tempe.
- 2004a *Cultural Resources Survey of the Senna Environmental Services Property at 90th Street and East Bahia Drive, Northern Scottsdale, Maricopa County, Arizona*. Report No. 04-08. Northland Research, Tempe.
- 2004b *Cultural Resources Survey of the Raintree Crossing Property at Raintree Drive and Northsight Boulevard, Scottsdale, Maricopa County, Arizona*. Report No. 04-41. Northland Research, Tempe.
- 2010 *Phoenix Convention Center Investigations: Volume 1: Archaeological Investigations of Pueblo Patricio in Blocks 11, 12, 17, and 18 of the Original Phoenix Townsite Phoenix, Arizona*. Technical Report No. 5. Logan Simpson Design, Tempe and Anthropological Papers No. 16. Pueblo Grande Museum, Phoenix, Arizona.
- 2011 *The CityScape Project: Archaeological Investigations of Pueblo Patricio and Block 22 in the Original Phoenix Townsite, Phoenix, Maricopa County, Arizona*. Technical Report in Prehistory No. 6. Logan Simpson Design, Tempe and Anthropological Papers No. 18. Pueblo Grande Museum, Phoenix.

Halbirt, C. D., and T. K. Henderson (editors)

- 1993 *Archaic Occupation on the Santa Cruz Flats: The Tator Hills Archaeological Project*. Northland Research, Flagstaff.

Hansen, E.

- 1996 *A Cultural Resources Survey and Records Search of the Desert Greenbelt Project, Reata Pass Channel, North Scottsdale, Maricopa County, Arizona*. Soil Systems, Inc. Technical Report No. 96-6. Phoenix.

Hart, D.

- 2001 *Cultural Resource Survey of 1.2 Acres Located Near the Intersection of North Hayden Road and North 84th Street, Scottsdale, Maricopa County, Arizona*. Report No. 01-89. Northland Research, Tempe.
- 2002 *Cultural Resources Survey of 0.3 Acres Located Near the Intersection of East Butherus Drive and North 74th Street, Scottsdale, Maricopa County, Arizona*. Report No. 02-08. Northland Research, Tempe.

- Hathaway, J. B.
 2000 *A Phase I (Class III) Archaeological Survey of 1.5 Acres for the Proposed Airplane Hangar and Office Complex at the Scottsdale Air Park, Scottsdale, Maricopa County, Arizona*. Report No. 127. Scottsdale Development Review Board Hearing Case # 134-PA99. The Louis Berger Group, Inc., Phoenix.
- Haury, E. W.
 1976 *The Hohokam: Desert Farmers and Craftsmen*. University of Arizona Press, Tucson.
- Haynes, C. V., Jr.
 1980 The Clovis Culture. *Canadian Journal of Anthropology* 1:115–21.
 2011 Distribution of Clovis Points in Arizona and the Clovis Exploration of the State, 11,000 B.C. *Kiva* 76:343–367.
- Henderson, T. K.
 1989 *Prehistoric Agricultural Activities on the Lehi-Mesa Terrace: Excavations at La Cuenca del Sedimento*. Northland Research, Flagstaff.
 1995 *The Prehistoric Archaeology of Heritage Square*. Anthropological Papers No. 3. Pueblo Grande Museum, Phoenix.
- Henderson, T. K., and M. R. Hackbarth
 2000 What is Going on at the Hohokam Village? A Fourteenth and Fifteenth Century Perspective. In *The Hohokam Village Revisited*, edited by D. E. Doyel, S. K. Fish, and P. R. Fish, pp. 287–316. Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science, Fort Collins, Colorado.
- Hill, J. B., J. J. Clark, W. H. Doelle, and P. D. Lyons
 2004 Prehistoric Demography in the Southwest: Migration, Coalescence, and Hohokam Population Decline. *American Antiquity* 69:689–716.
- Hohmann, J. W., and M. Davis
 2003 *A Class III Archaeological Survey of 20 Acres for the City View Estates, Scottsdale, Maricopa County, Arizona*. Report No. 446. The Louis Berger Group, Phoenix.
- Howard, J. B.
 1985 Courtyard Groups and Domestic Cycling: A Hypothetical Model of Growth. In *Proceedings of the 1983 Hohokam Symposium*, Part 1, edited by A. E. Dittert Jr. and D. E. Dove, pp. 311–26. Occasional Paper No. 2. Arizona Archaeological Society, Phoenix.
 1987 The Lehi Canal System: Organization of a Classic Period Community. In *The Hohokam Village: Site Structure and Organization*, edited by D. E. Doyel, pp. 211–21. American Association for the Advancement of Science, Glenwood Springs, Colorado.
 2001 *A Class III Archaeological Survey Report for the GTI Cellular Tower Project PHX-020B, Scottsdale, Arizona*. Howard Archaeological Surveys.
- Huckell, B. B.
 1982 *The Distribution of Fluted Points in Arizona: A Review and an Update*. Archaeological Series No. 145. Arizona State Museum, University of Arizona, Tucson.
 1995 *Of Marshes and Maize: Preceramic Agricultural Settlements in the Cienega Valley, Southeastern Arizona*. University of Arizona Press, Tucson.
- Hurlbut, S. A.
 1999 *Cultural Resources Survey for Proposed Sprint Communication Services Wireless Network Installation, Scottsdale, Maricopa County, Arizona*. Report 99-64. Archaeological Consulting Services, Tempe.

- Kemrer, S., S. Shultz, and W. Dodge
1972 *An Archaeological Survey of the Granite-Reef Aqueduct*. Archaeological Series No. 12. Arizona State Museum, Tucson.
- Kenny, B. W.
1987 *The New River-Stricklin Site, AZ T:4:1 (ASU): An Early Transitional Site in the Northern Hohokam Periphery*. Paper presented at the 1987 Hohokam Symposium, Arizona State University, Tempe.
- Kober, B.
2000 *Cultural Resources Survey of an Approximate One-acre Parcel at 84th Street and Pima Road, Scottsdale, Maricopa County, Arizona*. Technical Report No. 00-48. Northland Research, Tempe.
2002 *A Cultural Resources Survey of Approximately 1.5 Acres Located Near Frank Lloyd Wright Boulevard and Pima Road, Scottsdale, Maricopa County, Arizona*. Technical Report No. 02-15. Northland Research, Tempe.
- Kramer, S. J.
1995 *Cultural Resources Survey of CA 4.0 Mile Long Segment of Pima Freeway Right-of-Way Between Via Linda Drive and the Central Arizona Project Canal, Maricopa County, Arizona*. Archaeological Research Services, Tempe.
- Lange, R. C.
1982 *Letter Report to a Ms. Beverly Urke Regarding State Land Application 60-83916*. On file at the Arizona State Museum, Tucson.
- Larkin, R. A.
2000 *A Cultural Resource Survey of a 22.7 Acre Parcel Near the Intersection of Pima and Bell Roads, City of Scottsdale, Maricopa County, Arizona*. Stantec Consulting, Phoenix.
- Lausten, B.
2004a *A Cultural Resources Survey of Approximately 94 Acres for an Arsenic Removal Demonstration Project Pipeline Between Loop 101 and Jomax Road, Scottsdale, Maricopa County, Arizona*. Report No. 035299b. Logan Simpson Design, Tempe.
2004b *A Cultural Resources Survey of 1.1 Acres at 15229 North 75th Street, Scottsdale, Maricopa County, Arizona*. Report No. 035299c. Logan Simpson Design, Tempe.
2005 *A Cultural Resources Survey of 262.42 Acres Along Pima Road Between SR 101 and Pinnacle Peak Drive, Scottsdale, Maricopa County, Arizona*. Report No. 035062. Logan Simpson Design, Tempe.
- Lincoln, T. R.
1996 *Class III Survey of WestWorld Golf Course*. Bureau of Reclamation, Phoenix.
- Lindly, J. M.
2000a *An Archaeological Survey of Approximately 2 Acres near Perimeter and Princess Drives, Scottsdale, Arizona*. Report No. 00-286. SWCA, Environmental Consultants, Phoenix.
2000b *An Archaeological Survey of 110 Acres Northeast of Pinnacle Peak and Pima Roads in North Scottsdale Maricopa County, Arizona*. Report No. 00-274. SWCA, Environmental Consultants, Phoenix.
- Lonardo, C.
2001a *A Cultural Resources Survey of 4.9 Acres Located North of Greenway-Hayden Loop Road and East of Scottsdale Road, Scottsdale, Maricopa County, Arizona*. Report No. 015108. Logan Simpson Design, Tempe.
2001b *A Cultural Resources Survey of 37 Acres Located North of Westworld and East of Pima Road, Scottsdale, Maricopa County, Arizona*. Report No. 015102. Logan Simpson Design, Tempe.

- 2002 *A Cultural Resources Survey of 2.6 Acres Located South of McClain Drive and East of 78th Street, Scottsdale, Maricopa County, Arizona.* Report No. 025080. Logan Simpson Design, Tempe.
- 2006a *A Cultural Resources Survey of 9.85 Miles of Scottsdale Road Right-of-Way Between Indian School Road and Frank Lloyd Wright Boulevard, Scottsdale, Maricopa County, Arizona.* Report No. 065009. Logan Simpson Design, Tempe.
- 2006b *A Cultural Resources Survey of a 3 Acre Parcel Located at the Northeast Corner of 78th Street and Greenway Road, Scottsdale, Maricopa County, Arizona.* Report No. 065079. Logan Simpson Design, Tempe.
- Luchetta, S. K. and J. Moses
- 2009a *A Class I and Class III Cultural Resources Assessment Survey of a Proposed Wireless Telecommunications Facility AT&T Mobility H091 Located at North Church Road in Scottsdale, Maricopa County, Arizona.* Antigua Archaeology, Prescott.
- 2009b *A Class I and Class III Cultural Resources Assessment Survey of a Proposed Wireless Telecommunications Facility AT&T Mobility H092 Located at 9297 East Los Gatos Drive in Scottsdale, Maricopa County, Arizona.* Antigua Archaeology, Prescott.
- 2009c *A Class I and Class III Cultural Resources Assessment Survey of a Proposed Wireless Telecommunications Facility AT&T Mobility H274 Located at North 93rd Street South of East Paraiso Road in Scottsdale, Maricopa County, Arizona.* Antigua Archaeology, Prescott.
- 2009d *A Class I and Class III Cultural Resources Assessment Survey of a Proposed Wireless Telecommunications Facility AT&T Mobility H265 Located at 9658 East Happy Valley Road in Scottsdale, Maricopa County, Arizona.* Antigua Archaeology, Prescott.
- 2009e *A Class I and Class III Cultural Resources Assessment Survey of a Proposed Wireless Telecommunications Facility AT&T Mobility H078 Located at 10187 East Happy Valley Road in Scottsdale, Maricopa County, Arizona.* Antigua Archaeology, Prescott.
- 2009f *A Class I and Class III Cultural Resources Assessment Survey of a Proposed Wireless Telecommunications Facility AT&T Mobility H087 Located at 10032 East Pinnacle Peak Road in Scottsdale, Maricopa County, Arizona.* Antigua Archaeology, Prescott.
- 2009g *A Class I and Class III Cultural Resources Assessment Survey of a Proposed Wireless Telecommunications Facility AT&T Mobility H266 Located at East Pinnacle Peak Road in Scottsdale, Maricopa County, Arizona.* Antigua Archaeology, Prescott.
- 2009h *A Class I and Class III Cultural Resources Assessment Survey of a Proposed Wireless Telecommunications Facility AT&T Mobility H086 Located at 23402 North 92nd Street in Scottsdale, Maricopa County, Arizona.* Antigua Archaeology, Prescott.
- 2009i *A Class I and Class III Cultural Resources Assessment Survey of a Proposed Wireless Telecommunications Facility AT&T Mobility H264 Located at 9207 East Happy Valley Road in Scottsdale, Maricopa County, Arizona.* Antigua Archaeology, Prescott.
- 2010a *A Class I and Class III Cultural Resources Assessment Survey of a Proposed Wireless Telecommunications Facility AT&T Mobility K546 Located at East Desert Camp Drive and North 94th Way in Scottsdale, Maricopa County, Arizona.* Antigua Archaeology, Prescott.
- 2010b *A Class I and Class III Cultural Resources Assessment Survey of a Proposed Wireless Telecommunications Facility AT&T Mobility H284 Located at 9452 East Thompson Peak Parkway in Scottsdale, Maricopa County, Arizona.* Antigua Archaeology, Prescott.
- 2010c *A Class I and Class III Cultural Resources Assessment Survey of a Proposed Wireless Telecommunications Facility AT&T Mobility H268 Located at the Northwest Corner of East Happy Valley Road and North 112th Place in Scottsdale, Maricopa County, Arizona.* Antigua Archaeology, Prescott.
- 2010d *A Class I and Class III Cultural Resources Assessment Survey of a Proposed Wireless Telecommunications Facility AT&T Mobility H275-02 Located at 22220 North 97th Street in Scottsdale, Maricopa County, Arizona.* Antigua Archaeology, Prescott.

- 2010e *A Class I and Class III Cultural Resources Assessment Survey of a Proposed Wireless Telecommunications Facility AT&T Mobility H081 Located at 10907 East Happy Valley Road in Scottsdale, Maricopa County, Arizona.* Antigua Archaeology, Prescott.
- 2010f *A Class I and Class III Cultural Resources Assessment Survey of a Proposed Wireless Telecommunications Facility AT&T Mobility K687 Located at East Trailside View and North 91st Street in Scottsdale, Maricopa County, Arizona.* Antigua Archaeology, Prescott.
- 2010g *A Class I and Class III Cultural Resources Assessment Survey of a Proposed Wireless Telecommunications Facility AT&T Mobility H112-01 Located at 10697 East Horseshoe Canyon Drive in Scottsdale, Maricopa County, Arizona.* Antigua Archaeology, Prescott.
- 2010h *A Class I and Class III Cultural Resources Assessment Survey of a Proposed Wireless Telecommunications Facility AT&T Mobility H109-05 Located at 9469 East Diamond Rim Drive in Scottsdale, Maricopa County, Arizona.* Antigua Archaeology, Prescott.
- 2011 *A Class I and Class III Cultural Resources Assessment Survey of the Proposed Wireless Telecommunications Facility Sprint SUSD Copper Ridge School LS (PH80XC101-A) Located at 10101 East Thompson Peak Parkway in Scottsdale, Maricopa County, Arizona.* Antigua Archaeology, Prescott.
- 2014 *Cultural Resources Assessment Survey of 62 Proposed Telecommunication Facilities Located on Public Lands Across Arizona.* Antigua Archaeology, Prescott.
- Luhnow, G. G.
 2008 *A Cultural Resource Survey for the Princess Road Communications Line Project, City of Scottsdale, Maricopa County, Arizona.* Project No. 2008-001. Archaeological Consulting Services, Tempe.
- Lundin, D. R.
 2001a *An Archaeological Survey for the Proposed 20-acre Pratt Lot Split in Scottsdale, Maricopa County, Arizona.* Report No. 01-304, SWCA, Environmental Consultants, Phoenix.
- 2001b *An Archaeological Survey of 1.04 Acres near the Intersection of 78th Street and Frank Lloyd Wright Boulevard in Scottsdale, Maricopa County, Arizona.* Report No., 01-374. SWCA, Environmental Consultants, Phoenix.
- 2001c *An Archaeological Survey of Pima and Paraiso Roads Pumping Station for the Irrigation Water Distribution System (IWDB) Trunkline Facilities, North Scottsdale, Maricopa County, Arizona.* Report No. 01-390, SWCA, Environmental Consultants, Phoenix.
- 2001d *An Archaeological Survey of Pima Road Between Jomax Road and Union Hills Drive and Associated Proposed Pump Stations for the Irrigation Water Distribution System Trunkline in North Scottsdale, Maricopa County, Arizona.* Report No. 01-279, SWCA, Environmental Consultants, Phoenix.
- 2001e *An Archaeological Survey of Approximately 50 Acres for the Proposed Madrid Development in Scottsdale, Maricopa County, Arizona.* Report No. 01-414. SWCA, Environmental Consultants, Phoenix.
- 2003 *An Archaeological Survey of a One Mile Long Segment of Right-of-Way along Bell Road between 64th Street and Scottsdale Road in Phoenix, Maricopa County, Arizona.* Report No. 02-453. SWCA, Environmental Consultants, Phoenix.
- Mabry, J. B.
 1998 *Archaeological Investigations of Early Village Sites in the Middle Santa Cruz Valley.* Anthropological Papers No. 19. Center for Desert Archaeology, Tucson.
- 2000 *The Red Mountain Phase and the Origins of Hohokam Villages.* In *The Hohokam Village Revisited*, edited by D. E. Doyel, S. K. Fish, and P. R. Fish, pp. 37–63. Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science, Fort Collins, Colorado.
- Macnider, B. S.
 1989 *An Archaeological Assessment of an 800 Acres State Land Parcel in North Scottsdale for UDC Homes Construction.* Archaeological Consulting Services, Tempe.

- Madsen, J. H.
1983 *Letter Report to a Ms. Maureen Fleishman Regarding State Land Application 54-80231*. On file at the Arizona State Museum, Tucson.
- Marshall, J. T.
2001a *A Cultural Resources Survey of 1.26 Acres Near 83rd Avenue and Hayden Road, Scottsdale, Arizona. Technical Report No. 01-04*. Northland Research, Tempe.
2001b *A Cultural Resources Survey of 1.7 Acres at 7458 E. Monte Cristo Avenue, Scottsdale, Arizona. Technical Report No. 01-35*. Northland Research, Tempe.
2004 *A Cultural Resources Survey of 1.55 Acres at 15950 N. 76th Street, Scottsdale, Arizona. Technical Report No. 04-133*. Northland Research, Tempe.
2005 *Cultural Resources Survey of Approximately 1.3 Acres Near 80th Street and Hayden Road, Scottsdale, Maricopa County, Arizona*. Report No. 05-32. Northland Research, Inc., Tempe.
- Masse, W. B.
1991 *The Quest for Subsistence Sufficiency and Civilization in the Sonoran Desert*. In *Chaco and Hohokam: Prehistoric Regional Systems in the American Southwest*, edited by P. L. Crown and W. J. Judge, pp. 195–223. School of American Research Press, Santa Fe.
- Mitchell, D. R.
2002 *An Archaeological Survey and Assessment of 780 Acres for the "104th and Bell Road" Study area, Scottsdale, Maricopa County, Arizona*. SWCA, Environmental Consultants, Phoenix.
- Mitchell, D. R. and B. Caldwell
2006 *A Cultural Resources Survey of 1.3 Acres at 7975 E. McClain Drive in Scottsdale, Maricopa County, Arizona*. Report No. 06-105. SWCA, Environmental Consultants, Phoenix.
- Mitchell, D. R. and C. Schmidt
2004a *Archaeological Survey of a 2.6 Acre Parcel in the Scottsdale Airport Vicinity, Scottsdale, Maricopa County, Arizona*. Report No. 04-146. SWCA, Environmental Consultants, Phoenix.
2004b *Archaeological Survey of a 1.6 Acre Parcel in the Scottsdale Airport Vicinity, Scottsdale, Maricopa County, Arizona*. Report No. 04-145. SWCA, Environmental Consultants, Phoenix.
2004c *Archaeological Survey of Horseman's Park Parcel C, Scottsdale, Maricopa County, Arizona*. Report No. 04-284. SWCA, Environmental Consultants, Phoenix.
- Montero, L.
1999 *A Cultural Resource Survey of a 2.7-Acre Parcel Near Hayden Road and 83rd Place in Scottsdale, Maricopa County, Arizona*. Report No. 1999-006. Entranco, Phoenix.
- Moreno, J. L.
1999 *Cultural Resource Survey of Proposed APS Downing Substation Feeder Line Rights-of-Way, Scottsdale, Maricopa County, Arizona*. Archaeological Consulting Services, Tempe.
- Morris, D. H.
1969 *Red Mountain: An Early Pioneer Period Hohokam Site in the Salt River Valley of Central Arizona*. *American Antiquity* 34:40–53.
- Myers, C. L.
1986 *Forest City Scottsdale Company Cultural Resource Survey*. Janus, Phoenix.

- Nials, F. L., D. A. Gregory, and D. A. Graybill
 1989 Salt River Streamflow and Hohokam Irrigation Systems. In *The 1982–84 Excavations at Las Colinas: Environment and Subsistence*, by D. A. Graybill, D. A. Gregory, F. L. Nials, S. K. Fish, R. Gasser, C. Miksicek, and C. Szuter, pp. 59–76. Archaeological Series No. 162(5). Arizona State Museum, University of Arizona, Tucson.
- North, C., J. M. Lindly, and C. Schmidt
 2004 *An Archaeological Survey of 552 Acres of State Trust Land Near the Northwest Intersection of Jomax Road and 147th Avenue, Maricopa County, Arizona*. Cultural Resources Report No. 04-85. SWCA, Phoenix.
- North, C., R. F. Ryden, and C. Schmidt
 2004 *Archaeological Survey of 80 Acres near 94th Street and Bell Road, Scottsdale, Maricopa County, Arizona*. Report No. 04-200. SWCA, Environmental Consultants, Phoenix.
- North, C., C. Schmidt, and R. F. Ryden
 2004 *Archaeological Survey of the 7.4-Acre Cholla Parcel, Scottsdale, Maricopa County, Arizona*. Report No. 04-210. SWCA, Environmental Consultants, Phoenix.
- North, C. D., M. S. Foster, J. M. Lindly, and D. R. Mitchell
 2005 A Newly Discovered Clovis Point From the Phoenix Basin and an Update on Arizona Clovis Point Attributes. *Kiva* 70:293–307.
- Opfenring, D. J.
 1965 *The Herberger Site: A McDowell Mountain Hohokam Settlement*. Unpublished M.A. Thesis, on file at Arizona State University, Tempe.
- Owens, J. D.
 1995a *A Cultural Resources Survey of 14 Acres of Private Land Southeast of Pinnacle Peak and Pima Roads, North Scottsdale, Maricopa County, Arizona*. Technical Report No. 95-20. Soil Systems, Inc., Phoenix.
 1995b *A Cultural Resources Survey of Sections 29 and 31 of the DC Ranch Property, North Scottsdale, Maricopa County, Arizona*. Technical Report No. 95-12. Soil Systems, Inc., Phoenix.
- Peters, M.
 2007 *A Cultural Resource Inventory of Approximately 190 Acres of Municipally-owned Land Near the Intersection of 96th Street and Bell Road, Within and Around the Westworld Facility, Scottsdale, Maricopa County, Arizona*. Report No. 2007:043. Archaeological Research Services, Tempe.
- Phillips, B. G., G. E. Berg, L. Aguila, and B. S. Macnider
 2001 *Data Recovery at AZ U:5:33 (ASM) within the Pima Freeway Corridor Phoenix, Maricopa County, Arizona*. Cultural Resources Report No. 116. Archaeological Consulting Services, Tempe.
- Rainey, P. J.
 2005a *A Cultural Resources Survey for the Proposed Bell Loop and Bell Pass Trails, McDowell-Sonoran Preserve, City of Scottsdale, Maricopa County, Arizona*. Report No. 2005:118. Archaeological Research Services, Tempe.
 2005b *A Cultural Resources Survey of Approximately 0.13 Acres of City of Scottsdale Land for a Cellular Communications Facility Located at 6845 East Los Gatos Drive, Scottsdale, Maricopa County, Arizona*. Report No. 2005:148. Archaeological Research Services, Tempe.
- Rapp, J. M.
 2002 *A Cultural Resources Assessment and Survey of 70 Acres Near the Intersection of Hayden and Bell Roads, Scottsdale, Maricopa County, Arizona*. Report No. 025328. Logan Simpson Design, Tempe.

- 2003 *A Cultural Resources Survey of 399 Acres for the McDowell Sonoran Preserve, City of Scottsdale, Maricopa County, Arizona*. Report No. 995233, Logan Simpson Design, Tempe.
- 2007 *A Cultural Resources Survey of 24.7 Acres Along Pinnacle Peak Road, Between Miller and Pima Roads, Scottsdale, Maricopa County, Arizona*. Technical Report No. 065187, Logan Simpson Design, Tempe.

Rayle, C. E., and L. L. Fangmeier

- 2009a *A Class I Cultural Resource Literature Review and Class III Pedestrian Survey for a City of Scottsdale Wireless Telecommunications Facility Installation at East 12177 Calle Serena Drive in Scottsdale, Maricopa County, Arizona*. Project No. 09-030-02-01. Archaeological Consulting Services, Tempe.
- 2009b *A Class I Cultural Resource Literature Review and Class III Pedestrian Survey for a City of Scottsdale Wireless Telecommunications Facility Installation/Collocation at 9065 East Via Linda in Scottsdale, Maricopa County, Arizona*. Project No. 09-030-02-02. Archaeological Consulting Services, Tempe.
- 2009c *A Class I Cultural Resource Literature Review and Class III Pedestrian Survey for a City of Scottsdale Wireless Telecommunications Facility Installation at 20363 North Pima Road in Scottsdale, Maricopa County, Arizona*. Project No. 09-030-02-03. Archaeological Consulting Services, Tempe.
- 2009d *A Class I Cultural Resource Literature Review and Class III Pedestrian Survey for a City of Scottsdale Wireless Telecommunications Facility Replacement at 5401 North Hayden Road in Scottsdale, Maricopa County, Arizona*. Project No. 09-0303-02-04. Archaeological Consulting Services, Tempe.
- 2009e *A Class I Cultural Resource Literature Review and Class III Pedestrian Survey for a City of Scottsdale Wireless Telecommunications Facility Collocation at 39205 North Allister McKenzie Drive in Scottsdale, Maricopa County, Arizona*. Project No. 09-030-02-05. Archaeological Consulting Services, Tempe.
- 2009f *A Class I Cultural Resource Literature Review and Class III Pedestrian Survey for a City of Scottsdale Wireless Telecommunications Facility Collocation at 27775 North Alma School Parkway in Scottsdale, Maricopa County, Arizona*. Project No. 09-030-02-06. Archaeological Consulting Services, Tempe.
- 2009g *A Class I Cultural Resource Literature Review and Class III Pedestrian Survey for a City of Scottsdale Wireless Telecommunications Facility Collocation at 16701 North 100th Street in Scottsdale, Maricopa County, Arizona*. Project 09-030-02-07. Archaeological Consulting Services, Tempe.
- 2009h *A Class I Cultural Resource Literature Review and Class III Pedestrian Survey for a City of Scottsdale Wireless Telecommunications Facility Replacement at 26906 North Pima Road in Scottsdale, Maricopa County, Arizona*. Project 09-030-02-08. Archaeological Consulting Services, Tempe.

Recon Consultants

- 1993 *Cultural Resources Survey of 2500 Acres in North Scottsdale, Arizona*. Recon Consultants, San Diego.

Ritz, F.

- 1988 *Archaeological Survey Report for Horseman's Park*. Regional Environmental Consultants, Scottsdale.

Robinson, C. K. and S. R. Copeland

- 2002 *A Cultural Resources Survey of Approximately 160 Acres of Private Land, the Corrigan-Marley Stacked 40, North Scottsdale, Maricopa County, Arizona*. Report No. 02-44. Soil Systems, Inc., Phoenix.

Rogge, A. E.

- 2009 *Excavations within the State Route 101L/64th Street Locus of the Last Ditch Site, AZ U:5:33(ASM), Phoenix, Arizona*. Cultural Resources Report 2008-18(AZ). URS, Phoenix.

Roth, B. J.

- 1992 *Sedentary Agriculturalists or Mobile Hunter-Gatherers? Evidence on the Late Archaic Occupation of the Northern Tucson Basin*. *Kiva* 57:291–314.
- 1994 *An Archaeological Assessment of 493 Acres Between 64th Street and North Scottsdale Road, Phoenix, Maricopa County, Arizona*. Tierra Right of Way Services, Ltd., Tucson.

- Rowe, R.
2006 *A Cultural Resource Survey for 7 Acres for a Proposed Waterline Along Center Drive, City of Scottsdale, Maricopa County, Arizona*. EPG, Phoenix.
- Rozen, K.
1985 *ASLD Survey Report (App.#90979)*. On file at the Arizona State Museum, Tucson.
- Ruble, E. C.
2004 *Cultural Resources Survey of the Windgate Trail in the McDowell Sonoran Preserve, Scottsdale, Maricopa County, Arizona*. Report No. 04-155. Desert Archaeology, Tucson.
- Ryden, R. F. and J. M. Lindly
2000 *Archaeological Survey of 13 Acres at Northsight Boulevard and Butherus Drive, Scottsdale Arizona*. Report No. 00-119. SWCA, Environmental Consultants, Phoenix.
- Ryden, R. F., and D. R. Mitchell
2001 *An Archaeological Survey of the 160 acre Chauncey Ranch Property in North Scottsdale, Maricopa County, Arizona*. SWCA, Environmental Consultants, Phoenix.
- Santos, B. and M. Walsh
2003 *A Cultural Resources Survey of 45.23 Acres for the Proposed Widening of Scottsdale Road Between Frank Lloyd Wright Boulevard and Thompson Peak Parkway, Scottsdale, Maricopa County, Arizona*. Report No. 025279. Logan Simpson Design, Tempe.
- Schaafsma, H.
1999 *A Cultural Resources Survey of Approximately 100 Acres for Northsite Corporation, North Scottsdale, Maricopa County, Arizona*. Logan Simpson Design, Tempe.
- Schmidt, C.
2000a *A Cultural Resources Survey of an Approximately 1.5 Acre Parcel at Northsight Boulevard and Butherus Drive, North Scottsdale, Maricopa County, Arizona*. Technical Report No. 00-28. Northland Research, Tempe.
2000b *A Cultural Resources Survey of an Approximately 3 Acre Parcel at 91st Street and Bell Road, North Scottsdale, Maricopa County, Arizona*. Technical Report No. 00-31. Northland Research, Tempe.
2001 *A Cultural Resource Survey of the Cricket-Giant, PHX-019G Tower Site, Scottsdale, Maricopa County, Arizona*. Report No. 01-336. SWCA, Environmental Consultants, Phoenix.
- Schmidt, C. and D. R. Mitchell
2004a *An Archaeological Survey of Approximately 10 Acres South of Happy Valley Road and West of Alma School Road in North Scottsdale, Maricopa County, Arizona*. Report No. 2004-376. SWCA, Environmental Consultants, Phoenix.
2004b *Archaeological Survey of the 15-Acre Pima Road and Bahia Drive Study area in the City of Scottsdale, Maricopa County, Arizona*. Report No. 04-81. SWCA, Environmental Consultants, Phoenix.
- Schmidt, C., R. Ryden, and D. R. Mitchell
2004 *An Archaeological Survey of the 15-Acre Pima Road and Bahia Drive Study area in the City of Scottsdale, Maricopa County, Arizona*. Report No. 04-44. SWCA, Environmental Consultants, Phoenix.
- Schroeder, K. J.
1994 *An Archaeological Survey of 240 Acres in Section 16, Township 4 North, Range 5 East, Maricopa County, Scottsdale, Arizona*. Roadrunner Archaeology & Consulting, Tempe.

- 1997 *Cabo de Camino Archaeological Survey Maricopa County, Scottsdale, Arizona*. Roadrunner Archaeology & Consulting, Tempe.
- 2000 *Archaeological Survey of a 7.26 Acre Parcel, in T3N, R5E, Section 6, Scottsdale, Maricopa County, Arizona*. Roadrunner Archaeology & Consulting, Tempe.
- Shaw, C. W., Jr.
- 2002a *A Cultural Resources Survey of 6.9 Acres Near the Intersection of Bell Road and 94th Street, Scottsdale, Maricopa County, Arizona*. Report No. 02-28. Northland Research, Tempe.
- 2002b *A Cultural Resources Survey of 3.8 Acres at the Southwest Corner of Butherus Drive and Northsight Boulevard (Northsight Village III), Scottsdale, Maricopa County, Arizona*. Report No. 02-26. Northland Research, Tempe.
- 2002c *A Cultural Resources Survey of 3.16 Acres Near the Intersection of Bell Road and Pima Roads (McDowell Mountain Tech), Scottsdale, Maricopa County, Arizona*. Report No. 02-30. Northland Research, Tempe.
- 2002d *A Cultural Resources Survey of 16.3 Acres Near the Intersection of Bell Road and 91st Street Alignment (McDowell Business Center), Scottsdale, Maricopa County, Arizona*. Report No. 02-49. Northland Research, Tempe.
- Simon, A. W., J. H. Burton, and D. R. Abbott
- 1998 Intraregional Connections in the Development and Distribution of Salado Polychrome in Central Arizona. *Journal of Anthropological Research* 54(4):519–547.
- Sires, E. W.
- 1983 Archaeological Investigations at Las Fosas (AZ U:15:19). In *Hohokam Archaeology Along the Salt-Gila Aqueduct, Central Arizona Project, Volume VI: Habitation Sites on the Gila River*, edited by L. S. Teague and P. L. Crown, pp. 493–658. Archaeological Series No. 150. Arizona State Museum, University of Arizona, Tucson.
- Slawson, L. V.
- 2001a *Cultural Resources inventory for a Proposed Telecommunications Site (PH202-02) at 12837 Union Hills Drive in Scottsdale, Arizona*. Aztlan Archaeology, Tucson.
- 2001b *A Cultural Resources inventory for a Proposed Telecommunications Site (PH20920F, Troon) at 2500 North Windy Drive in Scottsdale, Arizona*. Aztlan Archaeology, Tucson.
- 2001c *A Cultural Resources inventory for a Proposed Telecommunications Site (PH54XC002A, Doc Holiday) at Pima Road and Thompson Peak Parkway, Scottsdale, Arizona*. Aztlan Archaeology, Tucson.
- Stahman, A. R.
- 2005 *An Archaeological Survey of a 5-Acre Parcel Located at the Intersection of 94th Street and Bahia Drive, Scottsdale, Maricopa County, Arizona*. Report No. 05-60. Northland Research, Tempe.
- Stein, P. H.
- 1990 *Homesteading in Arizona 1870–1942*. Arizona State Historic Preservation Office, Phoenix.
- Stephen, D.
- 2001 *Letter Report for Coleman/Ressie Rd. NEC Project, PAST Report No 001280*. Professional Archaeological Services and Technologies, Tucson.
- Stone, B. W.
- 2011 *Cultural Resources Survey of Approximately 29.4 Acres of Arizona State Trust Lands Located at the Southeast Corner of Scottsdale Road and Mayo Boulevard in Scottsdale, Maricopa County, Arizona*. Kimley-Horn and Associates, Inc., Tucson.

- Stone, L. M.
 1989 *Cultural Resources Survey of a Proposed Materials Storage Area within the Outer Loop Alignment near Bell Road at Pima Road North of Scottsdale, Maricopa County, Arizona*. Archaeological Research Services, Tempe.
 1990 *A Cultural Resources Survey of Section 9A of the Proposed Outer Loop Freeway in Northeast Scottsdale, Maricopa County, Arizona*. Archaeological Research Services, Tempe.
- Stubing, M.
 1998a *Archaeological Survey of the Proposed 5 Acre Ironwood Village Park in Northeast Scottsdale, Maricopa County, Arizona*. Report No. 98-115. SWCA, Environmental Consultants, Phoenix.
 1998b *Archaeological Survey of the Proposed 7 Acre McDowell Mountain Ranch Park in Northeast Scottsdale, Maricopa County, Arizona*. Report No. 98-112. SWCA, Environmental Consultants, Phoenix.
 2011 *A Cultural Resources Survey of Five Road Segments for the Scottsdale Pavement Preservation Phase 3 Project in Scottsdale, Maricopa County, Arizona*. Report No. 2011-001. Jacobs Engineering Group, Phoenix.
- Tremblay, A.
 2007 *A Cultural Resources Evaluation of 19 Acres at the Notre Dame Preparatory High School in Scottsdale, Maricopa County, Arizona*. Report No. 07-52. SWCA, Environmental Consultants, Phoenix.
- Turner, R. M., and D. Brown
 1994 Tropical-Subtropical Desertlands. Sonoran Desertscrub. In *Biotic Communities: Southwestern United States and Northwestern Mexico*, edited by D. Brown, pp. 181–222. University of Utah Press, Salt Lake City.
- Wallace, H. D., J. D. Heidke, and W. H. Doelle
 1995 Hohokam Origins. *Kiva* 60:575–618.
- Walsh, M.
 2000 *A Cultural Resource Survey of Approximately 2 Acres of Private Land Located Southwest of the Intersection of Pinnacle Peak and Pima Roads in Scottsdale, Maricopa County, Arizona*. Project Report 2000-007. Entranco, Phoenix.
 2014 *A Class III Cultural Resources Survey of 6.5 Acres at the Southwest Corner of Frank Lloyd Wright Boulevard and Northsight Boulevard, Scottsdale, Maricopa County, Arizona*. Report No. 135110. Logan Simpson Design. Tempe.
- Waters, M. R.
 1986 *The Geoarchaeology of Whitewater Draw, Arizona*. Anthropological Papers No. 45. University of Arizona, Tucson.
- Webb, D.
 2000 *A Cultural Resource Survey of a Temporary Construction Easement for a Detour Route of Scottsdale Road TI, Maricopa County, Arizona*. Technical Report No. 96519A. Logan Simpson Design, Tempe.
 2001a *A Cultural Resources Survey of a 19 Acre Lot at the Corner of Bell Road and 94th Street in Scottsdale, Arizona*. Technical Report No. 015309. Logan Simpson Design, Tempe.
 2001b *A Cultural Resources Survey of a Four Acre Right-of-Way Acquisition for the SR 101L Pima Freeway in Scottsdale, Arizona*. Technical Report No. 005194. Logan Simpson Design, Tempe.
 2001c *A Cultural Resources Survey of 78.85 Acres Southeast of the Intersection of Bell Road and the Loop 101 (Pima) Freeway in Scottsdale, Arizona*. Technical Report No. 015334. Logan Simpson Design, Tempe.
 2001d *A Cultural Resources Survey of a 10.2 Acre Lot for the Proposed McDowell Mountain Ranch Aquatic Center Located at the Corner of Thompson Peak Parkway and McDowell Mountain Ranch Road in Scottsdale, Arizona*. Technical Report No. 015229. Logan Simpson Design, Tempe.

- Wenker, C. T.
 1999a *The Park at La Mirada: An Archaeological Survey of 9 Acres in Scottsdale, Arizona*. Report No. 99-116. SWCA, Environmental Consultants, Phoenix.
- 1999b *An Archaeological Survey of 17 Acres in the Los Gatos Development, Scottsdale, Arizona*. Report No. 99-118. SWCA, Environmental Consultants, Phoenix.
- Wilcox, D. R.
 1979 The Hohokam Regional System. In *An Archaeological Test of the Sites in the Gila Butte-Santan Region, South-Central Arizona*, edited by G. Rice, D. R. Wilcox, K. Rafferty, and J. Schoenwetter, pp. 77–116. Anthropological Research Papers No.18. Arizona State University, Tempe.
- 1991 Hohokam Social Complexity. In *Chaco and Hohokam: Prehistoric Regional Systems in the American Southwest*, edited by P. L. Crown and W. J. Judge, pp. 253–75. School of American Research Press, Santa Fe.
- Wilcox, D. R., and L. O. Shenk
 1977 *The Architecture of Casa Grande and Its Interpretation*. Archaeological Series No. 115. Arizona State Museum, University of Arizona, Tucson.
- Wilcox, D. R., and C. Sternberg
 1983 *Hohokam Ballcourts and Their Interpretation*. Archaeological Series No. 160. Arizona State Museum, University of Arizona, Tucson.
- Wilcox, D. R., T. R. McGuire, and C. Sternberg
 1981 *Snaketown Revisited: A Partial Cultural Resource Survey, Analysis of Site Structure, and an Ethnohistoric Study of the Proposed Hohokam-Pima National Monument*. Archaeological Series No. 155. Arizona State Museum, University of Arizona, Tucson.
- Wilcox, S.
 2006 *A Cultural Resource Survey for the Proposed Granite Reef Substation ACE J/D North of Center Drive, City of Scottsdale, Maricopa County, Arizona*. EPG, Phoenix.
- Winter, K., and A. E. Rogge
 2001 *Cultural Resource Survey for Nextel Communication Tower Project: Ice Den AZ 0316, Scottsdale, Maricopa County, Arizona*. On file at Arizona State Museum, Tucson.
- Woodall, G. R.
 1993 *A Cultural Resources Survey of CA 2,230 Acres of State Land Near Scottsdale Road and Union Hills Drive in North Eastern Phoenix, Maricopa County, Arizona*. Archaeological Research Services, Tempe.
- Zarbin, E.
 1986 *Salt River Project: Four Steps Forward, 1902–1910*. Salt River Project, Phoenix.
- 1997 *Two Sides of the River: Salt River Valley Canals, 1867–1902*. Salt River Project, Phoenix.

Appendices

Confidential Information

Appendix A. Previous Research Maps

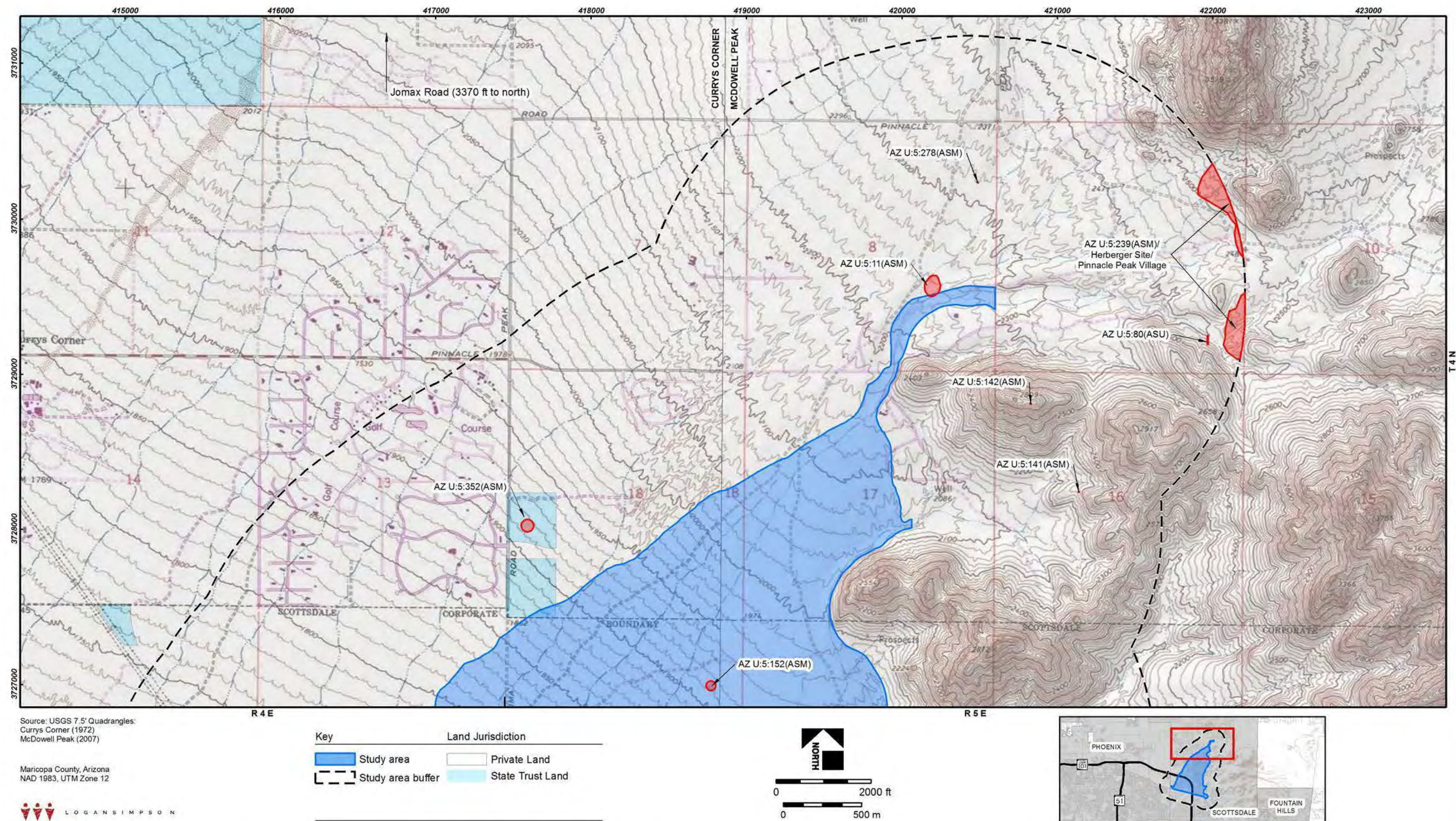


Figure A. 1. Previous sites within the Reata Wash Flood Control Improvement Study Area and 1-mile Buffer.

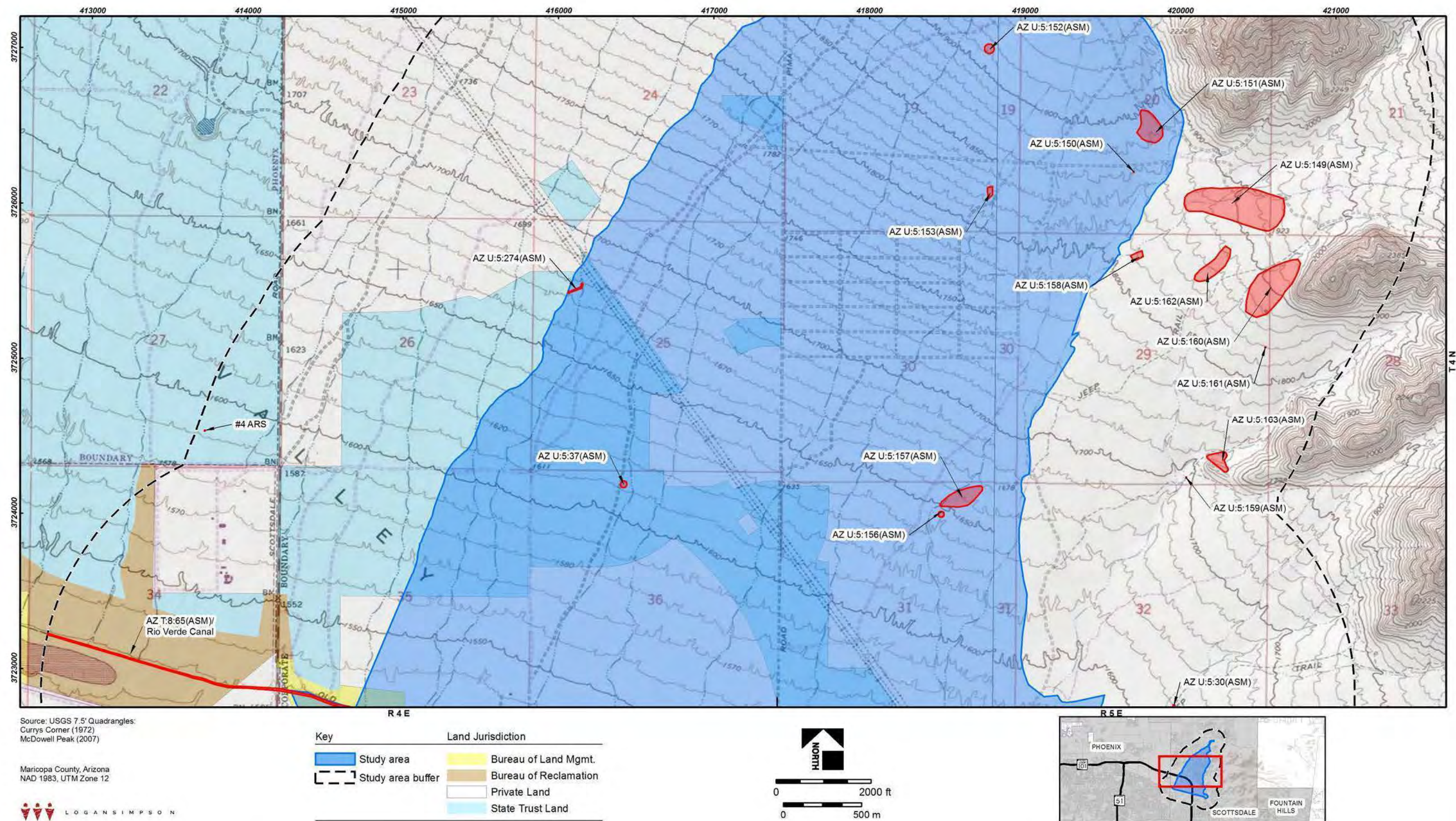


Figure A. 2. Previous sites within the Reata Wash Flood Control Improvement Study Area and 1-mile Buffer.

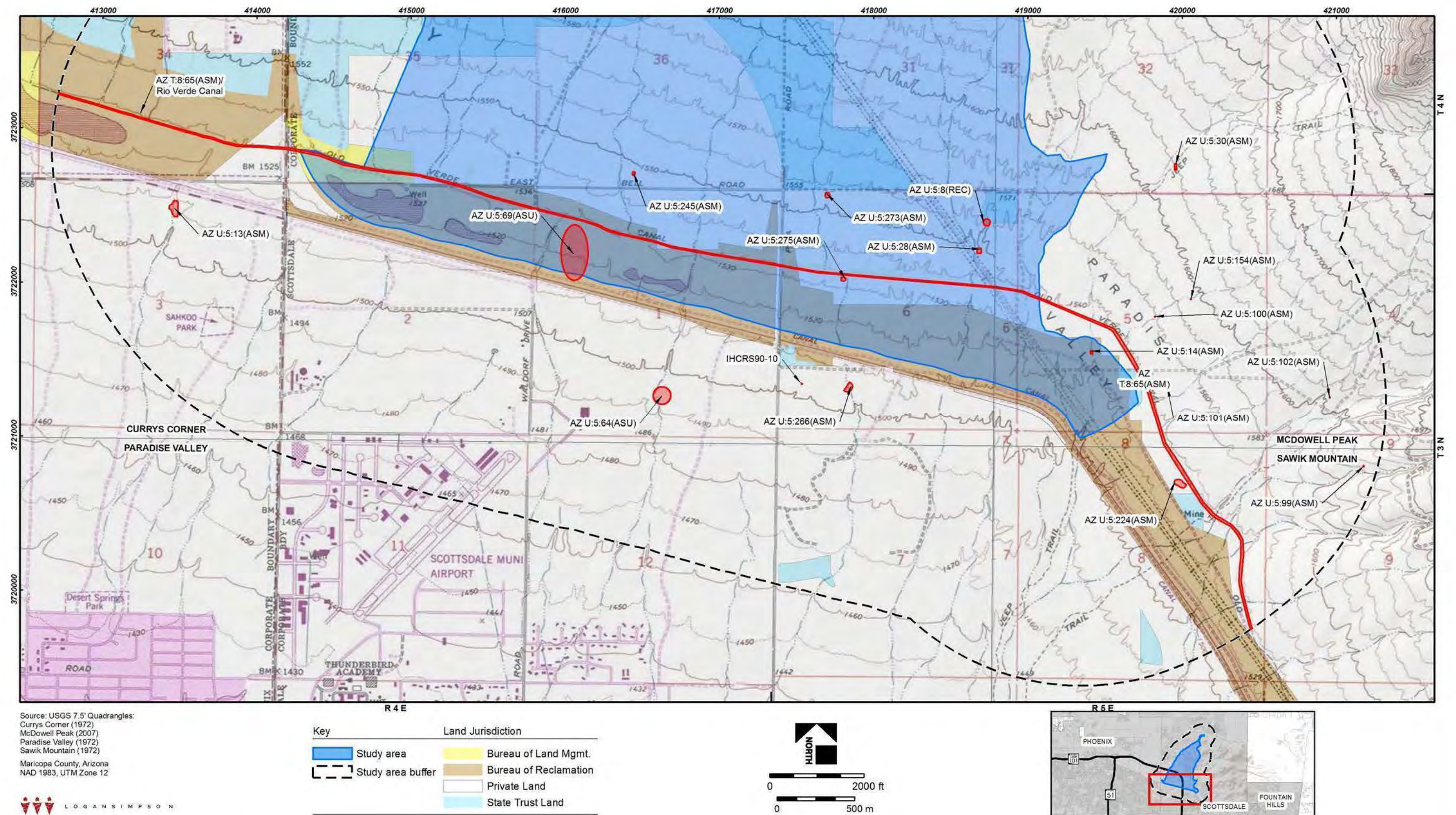


Figure A. 3. Previous sites within the Reata Wash Flood Control Improvement Study Area and 1-mile Buffer.

Appendix B. Site Summary Table

Table B.1. Study area and study area buffer Site Summary for the Reata Wash Flood Control Improvement Study.

Site number	Figure ¹	Site type ²	Land Status	Affiliation/Age	NRHP eligibility	UTM Easting	UTM Northing
AZ T:8:65(ASM)/ Rio Verde Canal	A.2, A.3	H-canal	Private, BOR and BLM	Euro-American; A.D. 1894–1902	Determined not eligible	417363	3721882
AZ U:5:8(REC)	A.3	Unknown	State Trust	Unknown	Not evaluated	418733	3722385
AZ U:5:11(ASM)	A.1	P-feature	Private	Prehistoric	Not evaluated	420197	3729566
AZ U:5:13(ASM)	A.3	P-artifact scatter	Private	Hohokam	Not evaluated	413464	3722475
AZ U:5:14(ASM)	A.3	H-feature	Private	Historic; A.D. 1850–1950	Not evaluated	419413	3721542
AZ U:5:28(ASM)	A.3	P-artifact scatter	Private	Hohokam	Not evaluated	418684	3722200
AZ U:5:30(ASM)	A.2, A.3	P-artifact scatter with feature	Private	Hohokam; A.D. 900–1100	Determined not eligible	419959	3722746
AZ U:5:37(ASM)	A.2	P-artifact scatter with feature	State Trust	Hohokam	Determined eligible (Criterion unknown)	416418	3724186
AZ U:5:64(ASU)	A.3	Unknown	Private	Unknown	Not evaluated	416626	3721262
AZ U:5:69(ASU)	A.3	P-artifact scatter	BOR	Hohokam	Recommended eligible (Criterion unknown)	416059	3722189
AZ U:5:80(ASU)	A.1	P-petroglyphs	Private	Prehistoric; 8000 B.C.–A.D. 1500	Recommended eligible (Criterion unknown)	421968	3729219
AZ U:5:99(ASM)	A.3	H-artifact scatter	Private	Historic; A.D. 1500–1950	Determined not eligible	421177	3720801
AZ U:5:100(ASM)	A.3	U-feature	Private	Unknown	Determined not eligible	419824	3721774
AZ U:5:101(ASM)	A.3	U-feature	Private	Unknown	Determined not eligible	419905	3721313
AZ U:5:102(ASM)	A.3	H-artifact scatter	Private	Historic; A.D. 1500–1950	Not evaluated	420957	3721249
AZ U:5:141(ASM)	A.1	H-feature and artifact scatter	Private	Historic; A.D. 1500–1950	Recommended not eligible	421138	3728239
AZ U:5:142(ASM)	A.1	H-feature	Private	Historic; A.D. 1500–1950	Determined not eligible	420828	3728809

Continued

Table B.1. Study area and study area buffer Site Summary for the Reata Wash Flood Control Improvement Study.

Site number	Figure ¹	Site type ²	Land Status	Affiliation/Age	NRHP eligibility	UTM Easting	UTM Northing
AZ U:5:149(ASM)	A.2	P-artifact scatter with feature	Private	Hohokam	Determined eligible (Criteria C, D)	420378	3725979
AZ U:5:150(ASM)	A.2	P-artifact scatter with feature	Private	Hohokam	Determined eligible (Criterion unknown)	419700	3726199
AZ U:5:151(ASM)	A.2	P-artifact scatter	Private	Hohokam	Determined eligible (Criterion D)	419804	3726482
AZ U:5:152(ASM)	A.1, A.2	P-artifact scatter with feature	Private	Hohokam	Determined eligible (Criterion D)	418771	3726991
AZ U:5:153(ASM)	A.2	P-artifact scatter	Private	Hohokam	Not evaluated	418775	3726069
AZ U:5:154(ASM)	A.3	P-feature	Private	Hohokam	Not evaluated	420057	3721889
AZ U:5:156(ASM)	A.2	P-artifact scatter with feature	Private	Hohokam; A.D. 800–1300	Recommended eligible (Criterion unknown)	418461	3723992
AZ U:5:157(ASM)	A.2	P-artifact scatter with feature	Private	Hohokam; A.D. 800–1000	Not evaluated	418596	3724101
AZ U:5:158(ASM)	A.2	P-artifact scatter with feature	Private	Hohokam; A.D. 1100–1400	Not evaluated	419723	3725658
AZ U:5:159(ASM)	A.2	P-artifact scatter with feature	Private	Hohokam; A.D. 200–1500	Recommended eligible (Criterion unknown)	420037	3724229
AZ U:5:160(ASM)	A.2	P-habitation	Private	Prehistoric; 8000 B.C.–A.D. 1500	Not evaluated	420582	3725453
AZ U:5:161(ASM)	A.2	P-artifact scatter with feature	Private	Hohokam; A.D. 200–1500	Recommended eligible (Criterion unknown)	420548	3725069
AZ U:5:162(ASM)	A.2	P-artifact scatter with feature	Private	Hohokam; A.D. 200–1300	Recommended eligible (Criterion unknown)	420216	3725593
AZ U:5:163(ASM)	A.2	P-artifact scatter with feature	Private	Hohokam; A.D. 200–1500	Not evaluated	420250	3724339
AZ U:5:224(ASM)	A.3	H-artifact scatter with feature	Private	Historic; A.D. 1500–1950	Not evaluated	419987	3720689

Continued

Table B.1. Study area and study area buffer Site Summary for the Reata Wash Flood Control Improvement Study.

Site number	Figure ¹	Site type ²	Land Status	Affiliation/Age	NRHP eligibility	UTM Easting	UTM Northing
AZ U:5:239(ASM)/ Herberger Site/ Pinnacle Peak Village	A.1	P-habitation	Private	Hohokam; A.D. 450–1100	Not evaluated	422087	3729740
AZ U:5:245(ASM)	A.3	P-artifact scatter	Private	Hohokam; A.D. 1000–1300	Recommended not eligible	416443	3722702
AZ U:5:266(ASM)	A.3	P-artifact scatter	Private	Prehistoric; 12000 B.C.–A.D. 1500	Recommended eligible (Criterion unknown)	417839	3721313
AZ U:5:273(ASM)	A.3	H-habitation	Private	Historic; A.D. 1500–1950	Recommended not eligible	417700	3722562
AZ U:5:274(ASM)	A.2	H-road	State Trust	Historic; A.D. 1500–1950	Recommended not eligible	416113	3725444
AZ U:5:275(ASM)	A.3	H-artifact scatter	Private	Historic; A.D. 1500–1950	Recommended not eligible	417803	3722017
AZ U:5:278(ASM)	A.1	H-artifact scatter	Private	Historic; A.D. 1500–1950	Recommended eligible (Criterion D)	420487	3730234
AZ U:5:352(ASM)	A.1	Unknown	State Trust	Unknown	Not evaluated	417590	3728022
#4 ARS	A.2	Unknown	State Trust	Unknown	Not evaluated	413721	3724531
IHCRS90-10	A.3	Unknown	Private	Unknown	Not evaluated	417533	3721338

¹ Map figures can be found within the appendices of the report. ² P = Prehistoric; H = Historic, U = Unknown